

# **NATIONAL TRANSPORTATION SAFETY BOARD**

WASHINGTON, D.C. 20594

## **HIGHWAY ACCIDENT REPORTS**

**SUMMARY FORMAT  
ISSUE NUMBER 1 -- 1980**

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**UNITED STATES GOVERNMENT**

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16. Abstract <p>The highway field activity for the first half of Fiscal 1980 included 25 highway accident investigations. This document contains summary reports and statements of probable cause of 20 of these reports. The other 5 will be published with the second half of FY 1980 reports. The criteria for selection of accidents for investigation were accident severity (5 or more fatalities), technical problems with a national implication and public interest. The summary reports briefly state the facts and circumstances of each accident, a brief analysis of the facts and the probable cause developed through the analysis. These summary reports are for use in providing a Safety Board approved statement of probable cause in the public docket. As reported they have no statistical significance. For more detailed information concerning any individual report, the reader may review the complete reference file in the Public Inquiries Section, National Transportation Safety Board, 800 Independence Avenue, S. W., Washington, D. C. 20594.</p>			
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## FOREWORD

The reports included in this publication represent the findings of the National Transportation Safety Board's field level investigations of 20 highway accidents. These investigations were conducted pursuant to Section 304 (a)(1)(B) of the Independent Safety Board Act of 1974. Each report contains in narrative form the Board's factual findings and analysis leading to a probable cause.

The accidents reported in this issue occurred in the first half of fiscal year 1980. Five additional highway accidents investigated by the Board during this period are not included herein, for they were still under investigation at the time of this printing. Those reports will be included in the next issue, which will also cover the latter half of fiscal year 1980.

The two tables on the following pages provide a breakdown of general causal and contributory factors, first in general as human, vehicular and environmental factors, and then, in specific terms in one category, human factors, for the preponderance of factors fell in that category. The reader should note that more factors than accidents are included in the tables, for most accidents have multiple causal or contributory factors. These breakdowns are for informational use only and have no statistical significance because of the small number of accidents reported herein.

As reports of the National Transportation Safety Board, the summary reports are subject to the limitation of 49 USC 1903(c):

"No part of any report or reports of the Board, relating to any accident or the investigation thereof, shall be admitted as evidence or used in any suit or action for damages growing out of any matter mentioned in such report or reports."

For those readers who wish more detailed information, the original factual reports are on file in the Washington, D.C., headquarters of the National Transportation Safety Board where they may be examined. These reports will be reproduced for a fee covering reproduction cost and postage. Orders for material also are subject to a user charge by the Board for special services, and such charge will be included in the bill.

Requests for copies of the factual reports should be forwarded to:

National Transportation Safety Board  
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Washington, D.C. 20594

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TABLE 1

## CAUSAL AND CONTRIBUTORY FACTORS

Type of Accident/Docket Number	CAUSAL			CONTRIBUTORY TO CAUSE			CONTRIBUTORY TO SEVERITY		
	Human <sup>1/</sup>	Vehicle	Environment	Human <sup>1/</sup>	Vehicle	Environment	Human <sup>1/</sup>	Vehicle	Environment
<u>2-Vehicle Headon Collision</u>									
NY-226	X								
NY-231	X			X			X		
NY-236	X			X			X		
NY-240	X			X		X			
NY-243	X			X					
NY-245	X								
<u>2-Vehicle Side Collision</u>									
NY-213	X						X		
NY-225	X			X	X	X			
NY-235	X								
NY-244	X								
<u>Multiple-Vehicle Headon Collision</u>									
NY-214	X						X		
NY-237	X								
<u>Single-Vehicle Collision with a Fixed Object</u>									
NY-218	X								
NY-229	X			X	X				
<u>Highway Grade Crossing</u>									
NY-227	X								
NY-230	X			X		X			
<u>Overturn</u>									
NY-261	X								
<u>...with Fire</u>									
NY-232		X		X					
<u>...with Immersion</u>									
NY-233	X			X					X
<u>2-Vehicle Rearend Collision</u>									
NY-215	X			X					

<sup>1/</sup> See Table 2 for specific human factors involved

000005

TABLE 2

## HUMAN FACTORS AS:

	CAUSAL	CONTRIBUTORY TO CAUSE	CONTRIBUTORY TO SEVERITY
<u>2-Vehicle Headon Collision</u>			
NY-226	passing maneuver; alcohol		
NY-231	driving on wrong side of road	avoidance action	speed; occupant restraints
NY-236	alcohol; directional control	speed	speed
NY-240	directional control; speed; steering	alcohol	
NY-243	failure to maintain lane	speed	
NY-245	driving on wrong side of road; alcohol		
<u>2-Vehicle Side Collision</u>			
NY-213	failure to yield right-of-way		speed; occupant restraints
NY-225	directional control	alcohol	
NY-235	passing maneuver		
NY-244	failure to yield right-of-way		
<u>Multiple-Vehicle Headon Collision</u>			
NY-214	maintain vehicle control; alcohol		speed
NY-237	passing maneuver		
<u>Single-Vehicle Collision with a Fixed Object</u>			
NY-218	alcohol; directional control		
NY-229	maintain vehicle control	alcohol	
<u>Highway Grade Crossing</u>			
NY-227	inattentiveness		
NY-230	hazard recognition	speed	
<u>Overtake</u>			
NY-241	directional control; speed		
<u>... with Fire</u>			
NY-232		overloading policy; maintenance	
<u>... with Immersion</u>			
NY-233	failure to maintain lane	alcohol	
<u>2-Vehicle Rearend Collision</u>			
NY-215	maintain vehicle control	fatigue; speed	

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NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H001  
DOCKET NO. HY-213-79

LOCATION: Texas State Highway 202 and East Frontage Road to U.S. 181  
Beeville, Texas

FACILITY/VEHICLE:

1. 1973 2-door Pontiac Trans Am coupe  
Operator: John Fenwick Nicholson III  
Beeville, Texas
2. 1963 4-door Ford Country Sedan Stationwagon  
Operator: Patricia Beltran Rosas  
Beeville, Texas

TIME: 0001

DATE: 10/13/79

PROPERTY DAMAGE: \$1,500 (estimated)

INJURIES: 6 FATAL  
4 NONFATAL  
0 NONE

000007

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the Pontiac driver's failure to stop before entering a stop-sign-controlled intersection. Contributing to the severity of the accident were the excessive rate of speed of the Pontiac and the failure of any person involved in the accident to wear the available occupant restraints.

## INVESTIGATION

### The Accident

On October 13, 1979, at about 12:01 a.m., a 1973 Pontiac Trans Am was traveling north on the east frontage road to U.S. Route 181. At the same time, a 1963 Ford stationwagon was eastbound on Texas State Highway 202 (SH 202), approaching the intersection with the frontage road. The Pontiac's speed was calculated at between 72 and 77 mph, and the Ford's speed was calculated at between 53 and 58 mph. Vehicles on the frontage road are required to stop at the intersection with SH 202. The Pontiac did not stop before it entered the intersection and was struck by the Ford. Initially, the Ford impacted the Pontiac, front to left front side, but the Pontiac's speed was such that maximum engagement occurred at its left C-pillar area.

Both vehicles began to rotate counterclockwise rapidly. The Pontiac traveled off the pavement at the northeast corner of the intersection, struck a delineator post and vaulted from a concrete culvert into a dirt embankment, about 102 feet from impact. It then rotated clockwise, traveling about 13 feet, until it came to rest facing west. All three Pontiac occupants were ejected. The driver came to rest on the embankment behind the vehicle; both passengers were near the vehicle's left rear wheel.

Meanwhile, the Ford rotated across the westbound lanes of SH 202 and slid off the northeast corner of the intersection where it impacted a 2-inch pipe signpost. The vehicle continued its counterclockwise rotation until its rear impacted the embankment, the vehicle facing nearly south. Five of the seven Ford occupants were ejected. The Ford driver came to rest on the embankment behind the Pontiac. The right front passenger came to rest near the Ford's left rear wheel; an infant who was being held by the right front passenger was beneath the Ford's rear bumper. Two children came to rest in the eastbound lanes of State Highway 202, and two children remained in the Ford's rear passenger area. (See figure 1.)

A small fire erupted at or near the Ford's carburetor. Passersby quickly removed the two children from the Ford and carried them to safety. Rescue forces extinguished the fire before it could spread beyond the motor compartment.

Of the three Pontiac occupants, the driver and a rear-seat passenger were killed. The right front passenger sustained critical head injuries but survived. Four of the five Ford occupants ejected from the vehicle also died. Two children who remained in the rear passenger area survived. None of the occupants of either vehicle was wearing available seatbelt and shoulder harness.

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### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>		<u>Passengers</u>	
	Ford	Pontiac	Ford	Pontiac
Fatal	1	1	3	1
Nonfatal	0	0	3	1
None	0	0	0	0

### Vehicle Information

The 1973 Pontiac Trans Am was a red, 2-door coupe, owned by the driver and equipped with an eight-cylinder 455 c.i.d. engine and a 3-speed automatic transmission with the selector lever mounted on the center console. It also was equipped with power-assisted front disc/rear drum brakes and power-assisted steering. Interior padding consisted of padded upper instrument panel, steering wheel rim, visors, door panels, armrests and integral head restraints. Two lap and shoulder belts for the front bucket seats and two lap belts for the rear were installed in the car.

Impact damage began at the Pontiac's left front corner and extended 161 inches rearward along the vehicle's left side. Maximum crush was 12-1/2 inches at the lower left A-pillar. The left door was torn from the vehicle. As the Pontiac moved forward, its left A-pillar impacted the Ford's hood and was torn from the vehicle.

The white 1963 Ford Country Sedan 4-door stationwagon was owned by the driver and was equipped with an eight-cylinder 352 c.i.d. engine and "cruiseomatic" transmission with the selector lever mounted on the column. The vehicle also was equipped with power-assisted steering and manual all-drum brakes. Interior padding was limited to the armrests. The front seat was equipped with 2 lap belts, one for the driver and one for the right front passenger.

Primary impact damage extended across the entire front of the Ford. Maximum crush was 36-1/4 inches at the left front corner, tapering to 12-1/2 inches at the right center front and 13-1/2 inches at the right front corner. There was secondary impact damage from the signpost in the right front door, with 5 inches of penetration. The Ford's right front corner was displaced 18-3/4 inches to the left, 30 inches at the left front corner. The front bumper was displaced 23-1/2 inches to the left. The star locking mechanism on the right front door fractured, allowing the door to open.

The windshield exhibited stress cracks on its right side. The backlight and right quarter panel windows shattered, with glass fragments remaining around the edges of both windows. There was very little glass inside the stationwagon and no damage to the other glazing.

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#### Driver Information

The 21-year-old Pontiac driver held a valid Texas operator's license with no restrictions. His driving record showed two convictions, both for "excessive acceleration" and also the notation, "No report of approved driver education course."

The Pontiac driver spent the day preceding the accident fine-tuning his automobile's engine. Friends of the driver reported that during the evening hours prior to the accident the Pontiac driver visited several commercial establishments frequented by young people and, several times, issued challenges for others to drag race against his Pontiac. The same witnesses stated that none of the Pontiac occupants had been drinking.

Just prior to the accident, the Pontiac overtook another vehicle traveling 70 - 75 m.p.h. Witnesses in that vehicle stated that the Pontiac would come up close behind their car, then drop back. After repeating this action, the Pontiac passed their vehicle at a speed they estimated at 100 - 110 m.p.h.

The 27-year-old Ford driver held a valid Texas operator's license with no restrictions. Her driving record showed one conviction, speeding, on March 3, 1978.

#### Highway Information

Texas State Highway 202 is a straight four-lane, asphalt roadway. West of the intersection it is 60 feet 9 inches wide with four traffic lanes and one continuous left-turn storage lane. The pavement begins to funnel from a 60-foot width to a 48-foot width east of the intersection. West of the intersection the highway is level; going east from the intersection, it has a positive 2.0 percent grade.

In the Beeville area, U.S. 181 is a four-lane divided highway which passes over State Highway 202. Along either side of U.S. 181 there are one-way, two-lane frontage roads; exit/entrance ramps connect U.S. 181 to the frontage roads about 0.2 mile north and south of State Highway 202. The west frontage road is one-way south, and the east is one-way north.

The 2-lane, 23.5-foot-wide east frontage road is asphalt paved. Lanes are delineated by a lane line, but no edge lines. A 2-foot-wide stop line is painted entirely across the frontage road about 44 feet south of the intersection. In addition to route markers and destination signs, two "Stop Ahead" signs are posted, one on each side of the road, 654 feet south of the intersection and oriented for northbound drivers. "Stop" signs are posted about 48 feet south of the intersection, one 14 feet east, and the other 13 feet west of the respective pavement edges.

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The east frontage road is tangent for the final 538 feet of its northbound approach to the intersection. Beyond that point it curves slightly to left. Highway grading on the frontage road is -1.78 percent approaching, level across and -2.07 percent proceeding north from the intersection.

The intersection is a slightly angular cross-intersection. The angle between the north and west approaches is 97 degrees. Due to the grade separation between U.S. 181 and State Highway 202, U.S. 181 is laid on a fill. The fill obstructs the view of both drivers until within 150 feet of the intersection. However, the fill slope is such that a driver stopped at the stop line on the frontage road can see to the left with only a partial view obstruction presented by the overpass support pillars.

#### ANALYSIS

The fill upon which U.S. 181 was laid presented a permanent view obstruction to the converging vehicle drivers, such that neither driver could have been aware of the other vehicle's approach until each was within 150 feet of the intersection. The comparatively high speeds combined with the view limitations to present an element of surprise to each driver. Neither could have seen the other vehicle in time to take avoidance action.

Impact forces, notwithstanding the speeds involved, were not beyond human tolerances. Computations based on crush dimensions indicate the change in velocity due to impact imparted to the Ford was about 26 - 28 mph. While there is insufficient data to compute this figure for the Pontiac, the collision configuration suggests it probably was less than that for the Ford. The comparatively low change in velocity could have been a result of minimal engagement time.

At impact, the Ford's hood overrode the Pontiac's hood, contacted and removed its upper left A-pillar and intruded into the passenger compartment. The Pontiac driver's head contacted the right front corner of the Ford's hood, resulting in fatal injury. During vehicle-to-vehicle engagement, the Pontiac's left door hinges separated, but the door apparently remained on the vehicle as the Pontiac spun away from the Ford. The Pontiac rotated about 220 degrees counterclockwise, skidded off a culvert and vaulted to an embankment, its left forward side impacting the embankment. This impact and rebound caused the door to separate from the vehicle and the three occupants to be ejected through the left door opening.

The Ford's right quarter panel and backlight windows were shattered, with very little glass in the vehicle but large amounts on the road surface, indicating that both windows had been struck from inside the vehicle. As the Ford rotated or pivoted, centrifugal forces were generated,

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substantial enough to propel the occupants toward the rear of the vehicle. Probability indicates that the passengers struck, shattered and were ejected through one or the other rear windows.

The degree of injuries was more severe than might ordinarily be expected with a 26 - 28 mph change in velocity due to impact, indicating these injuries occurred as a result of ejection. In this case, proper use of available restraints could have reduced injury severity and saved lives.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the Pontiac driver's failure to stop before entering a stop-sign-controlled intersection. Contributing to the severity of the accident were the excessive rate of speed of the Pontiac and the failure of any person involved in the accident to wear the available occupant restraints.

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Accident Schematic

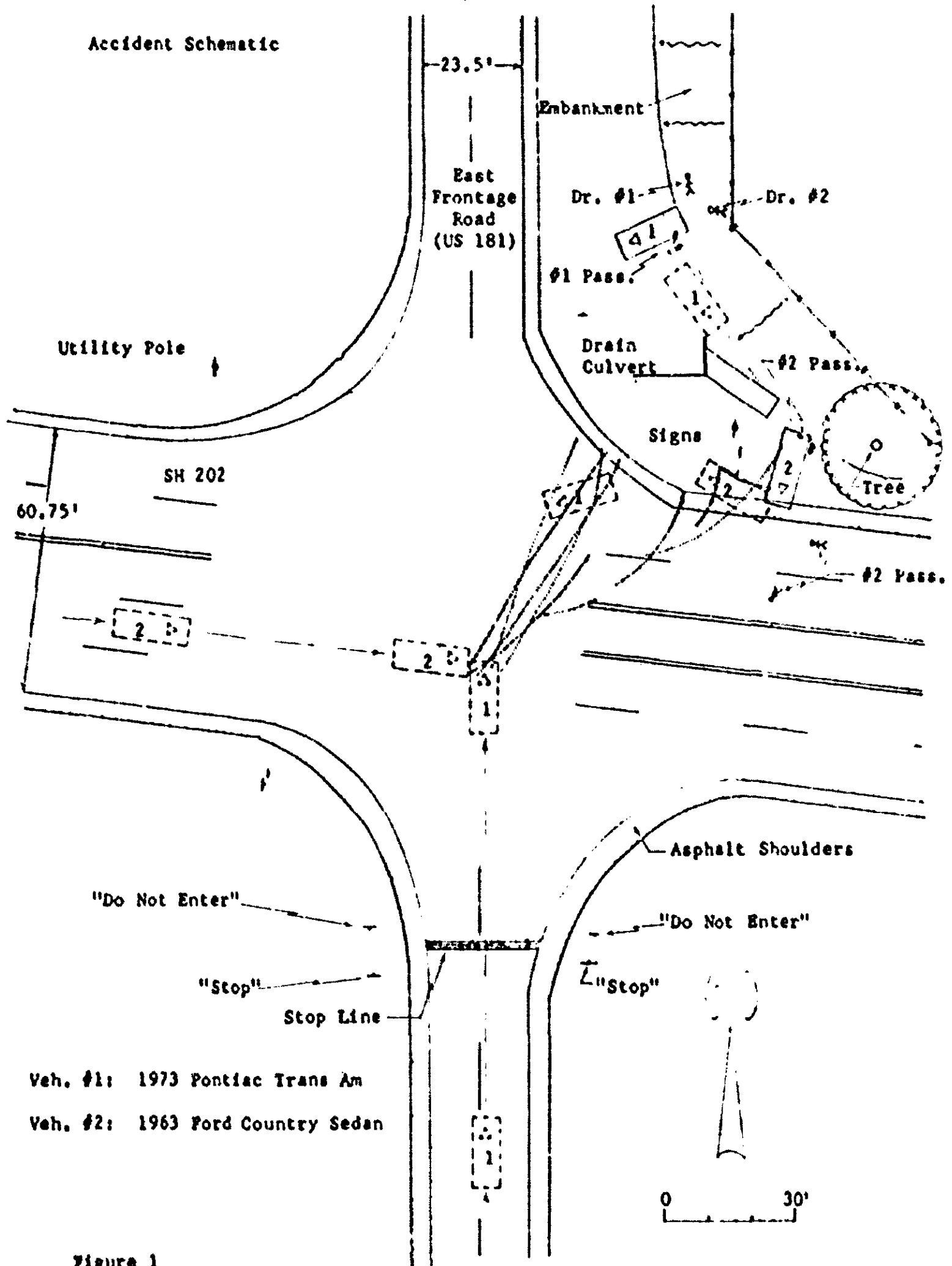


Figure 1

000013

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H002  
DOCKET NO. HY-214-79

LOCATION: U.S. Route 20 near Springfield Drive  
Roselle, Illinois

FACILITY/VEHICLE:

- |  |  |
|--|--|
| 1. 1974 4-door Cadillac Sedan de Ville<br>Operator: Kirk H. Hankin<br>Bensenville, Illinois    | 4. 1975 2-door Oldsmobile Cutlass<br>Operator: Marguerite M. Stipp<br>Melrose Park, Illinois |
| 2. 1966 2-door Chevrolet Caprice hardtop<br>Operator: Donald J. Menig<br>Bensenville, Illinois | 5. 1977 2-door Chevrolet Chevelle<br>Operator: John W. Pobloske<br>Hanover Park, Illinois    |
| 3. 1973 2-door Pontiac Le Mans Coupe<br>Operator: Thomas A. Baird<br>Bensenville, Illinois     |  |

TIME: 0032

DATE: 10/14/79

PROPERTY DAMAGE: \$6,500 (estimated)

INJURIES: 5 FATAL  
0 NONFATAL  
2 NONE

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the operation of the 1974 Cadillac and 1966 Chevrolet by the drivers whose judgment and driving ability were impaired by alcohol. Contributing to the severity of the accident was the excessive speed of these two vehicles.

000014

## INVESTIGATION

### The Accident

En route to their residences in Bensenville, Illinois, a 1974 Cadillac and a 1966 Chevrolet were traveling eastward on U.S. 20, a 4-lane undivided highway at about 12:32 a.m. on October 14, 1979. The two vehicles were traveling almost parallel at a high rate of speed, with the Cadillac in the inside lane and the Chevrolet in the outside lane. Just before the accident, both cars crossed the centerline of the road into the opposing traffic lanes.

Almost simultaneously, the Cadillac struck a westbound 1973 Pontiac headon in the outside lane, and the Chevrolet struck a westbound 1975 Oldsmobile, also headon, in the inside lane. The Cadillac continued eastward, propelling the Pontiac to the shoulder of the westbound lanes. When they stopped, the Pontiac toppled over, landing on the hood of a fifth car, a westbound 1977 Chevrolet which had pulled to the shoulder and stopped to avoid the observed accident. (See Figure 1)

Five of the seven persons involved in the accident died, the drivers and sole occupants of the 1974 Cadillac, 1973 Pontiac and 1975 Oldsmobile and the driver and passenger of the 1966 Chevrolet. Both driver and passenger of the 1977 Chevrolet escaped injury.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>	<u>Passengers</u>
Fatal	4	1
Nonfatal	0	0
None	1	1

### Vehicle Information

The 1974 Cadillac was a dark brown four-door Sedan de Ville owned by the driver and equipped with automatic transmission, power windows, seats and antenna, and front disc brakes. Its tires were Yokohama GT Special Steel 858, size LR878S15. The left front tires had a tread depth of 6/32 inch; the rest of the tires had tread depth of at least 8/32 inch.

The 1966 Chevrolet was a black two-door hardtop Caprice owned by the driver and equipped with a V-8 engine and automatic transmission with a floor console. Its tires were Michelin 205X Belted. All tires had a tread depth of at least 9/32 inch.

The 1973 Pontiac was a gold two-door Le Mans owned by the driver's father and equipped with a V-8 engine and automatic transmission with a floor console. Three of its tires, left front, right rear, right front, were Goodyear Power Streaks, size F78-14, with respective tread depths of 7/32, 1/32 and 4/32 inch. The left rear tire, a Uniroyal Glas Belt-Fastrak, size G78-14, had a tread depth of 6/32 inch.

000015

The 1975 Oldsmobile was a blue two-door Cutlass Supreme owned by its driver and equipped with a V-8 engine and automatic transmission. Its tires, all Sears Super Guard, size GR-78-15, had 9/32 inch of tread.

The 1977 Chevrolet was a gold two-door Malibu Classic Chevelle owned by its driver and equipped with front disc brakes and an automatic transmission. Its tires were Goodrich Life Saver 78 Steel Belted Radials. All had a tread depth of at least 7/32 inch.

Impact on the Cadillac was headon to the left front at about 9.8 degrees. The left front tire was pushed up into the firewall, shoving the brake pedal up to the bottom of the dash. The left hood hinge broke loose, permitting the left rear corner of the hood to penetrate the windshield into the driver compartment, as did the left "A" pillar. The steering column was bent upwards and to the left, and the left front of the dash was displaced rearward about 10 inches.

The left front door's outer shell bowed out, and the inner shell bowed in, for a total separation of 19 inches. The left rear door's outer shell separated from the rest of the door and overlapped the rear fender by 7 inches. The driver's seat right track tore loose, allowing the seat to pivot up and to the left. Also, the seat broke loose from the left rear track connection.

Preimpact damage found on the right rear fender consisted of indented sheet metal with a circular trace pattern of tire rubber residue on the fender and side skirt.

Chevrolet (1966) impact was almost directly headon. The hood was torn from the car. The dash was shoved into the passenger compartment, along with the bottom edge of the windshield. The differential broke loose from the drive line. A piece of wood was lodged in the left side metal just to the rear of the back wheel well. Also, paint matching that on the Cadillac was found on the left rear wheel.

Impact on the 1973 Pontiac, that struck by the Cadillac, was to the left front, with the resulting crush at a 59.8 degree angle. The frame was bent in the front and rear of the passenger compartment. The left door was crushed into the driver's compartment about 10 inches.

Impact on the 1975 Oldsmobile from the 1966 Chevrolet was almost directly headon. The bumper was crushed back to the front axle. The right side of the dash was shoved back over the passenger seat.

The majority of the damage to the 1977 Chevrolet, the vehicle stopped on the shoulder, was to the tip of the front fenders and hood from the vertical impact of the Pontiac. The sheet metal behind the bumper was slightly crumpled, indicating the bumper had been dislocated rearward just slightly. Also, the left rear fender area was scraped and crumpled with black paint residue in the area. This black paint matched the color of the 1966 Chevrolet.

000016



### Driver Information

The Cadillac driver, a 17-year-old male, held a valid Illinois operator's license with no restrictions. In the last 12-month period he had two traffic convictions. In April of 1979 he was convicted of illegal transportation/possession of alcoholic liquor in an automobile, and in October 1978, he was convicted of disregarding a stop or yield sign at an intersection.

The driver of the 1966 Chevrolet also was a 17-year-old male. His license was in a suspended status. In the last 12 months he had been charged with six traffic offenses, including driving under the influence of alcohol, speeding, failing to give signals and illegal transportation of liquor.

Both drivers left a residence in Hanover Park, Illinois about 12:05 a.m. en route to their own homes. During the trip, according to several witnesses, the vehicles were driven recklessly and fast. Reckless driving included encroaching on the opposite lanes, passing on the right and cutting in front of other vehicles at dangerously close distances. One witness stated he saw the Cadillac begin to force the Chevrolet off the road onto the shoulder just west of the accident site.

The 3 remaining drivers, those of the 1973 Pontiac, the 1975 Oldsmobile and the 1977 Chevrolet, all held valid driver licenses issued by Illinois with no restrictions.

### Highway Information

U.S. 20, a 4-lane, undivided highway, was marked with a solid yellow centerline, dashed white lane lines and solid white edge lines. On each side of the road was a 10-foot-wide dirt shoulder. The posted 45 m.p.h. speed limit applied for long distances east and west of the accident site. Eastbound traffic passed a speed limit sign just prior to the point of impact. (See Figure 1)

Investigators found two parallel skid marks in the median westbound lane, 1 foot apart and each 40 feet long. The skid marks led up to a small area of gouge marks about where the 1966 Chevrolet and 1975 Oldsmobile collided.

Another area of gouge marks was about 40 feet west of this impact area. These straddled the westbound lane lines, about where the Cadillac struck the Pontiac.

Three skid marks ended about 80 feet west of the accident area in the eastbound lanes. The two outermost marks curved inward from the shoulder toward the pavement; when the northernmost of the two rejoined the pavement, the other skid mark continued west on the shoulder for about 190 feet. It too then rejoined the pavement. The third mark extended west on the pavement between the two previously described. It swerved toward the shoulder and ran on the edge of the pavement.

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A pile of wood on the eastbound outside edge of the shoulder was found at about the midpoint of the first skid mark. There were several freshly broken pieces.

#### Medical and Pathological Information

Toxicology tests were performed on all drivers except that of the 1977 Chevrolet, the surviving driver. The postaccident tests revealed the following blood alcohol levels (BAL):

<u>Driver</u>	<u>BAL (percent)</u>
1974 Cadillac	0.130
1966 Chevrolet	0.190
1973 Pontiac	0.043
1975 Oldsmobile	negative

#### ANALYSIS

Witness statements indicate that the Cadillac and 1966 Chevrolet were being driven in a reckless manner and at a high rate of speed. Physical evidence supports one witness who stated that the Cadillac forced the Chevrolet off the road onto the shoulder just prior to the accident site. A skid mark on the shoulder could have been made by the Chevrolet. (See Figure 1). This is supported by the piece of broken wood found in the right rear side of the car. This piece of wood appears to match the freshly broken wood debris lying next to skid mark No. 1 on the shoulder. Skid mark No. 3 probably was made by a right tire of the Cadillac.

If skid mark 1 was made by the Chevrolet's right rear tire, skid mark 2 made by its right front tire and skid mark 3 made by one of the Cadillac's right tires, then the vehicles would have come together momentarily. This would have permitted the Chevrolet's left rear tire to leave a circular rubber mark on the Cadillac's right rear fender and to pick up paint from that car at the same time. The circular pattern of the rubber on the Cadillac suggests that both vehicles were traveling the same speed.

The conclusion is that both vehicles were traveling about the same speed in the eastbound lanes. The Chevrolet went off the road onto the south shoulder, with the Cadillac moving alongside. They then both came back onto the road, crossed the road into the westbound lanes and collided with oncoming vehicles. The 1966 Chevrolet began braking about the time the Cadillac collided with the Pontiac. The Chevrolet then skidded headon into the Oldsmobile.

A speed estimate for the Chevrolet indicates it was traveling between 79 and 82 m.p.h. at impact and 84 to 87 m.p.h. prior to skidding. The mathematical speed estimate for the Cadillac is 80 m.p.h. at impact. Because of the previous conclusion that both vehicles were traveling at the same speed, the Cadillac probably was traveling between 84 and 87 m.p.h. too as it crossed the centerline. The difference between the two speeds could have occurred from braking, which did not lock the Cadillac's wheels, but slowed it to 80 m.p.h. from the range of 84 to 87 m.p.h.

000018

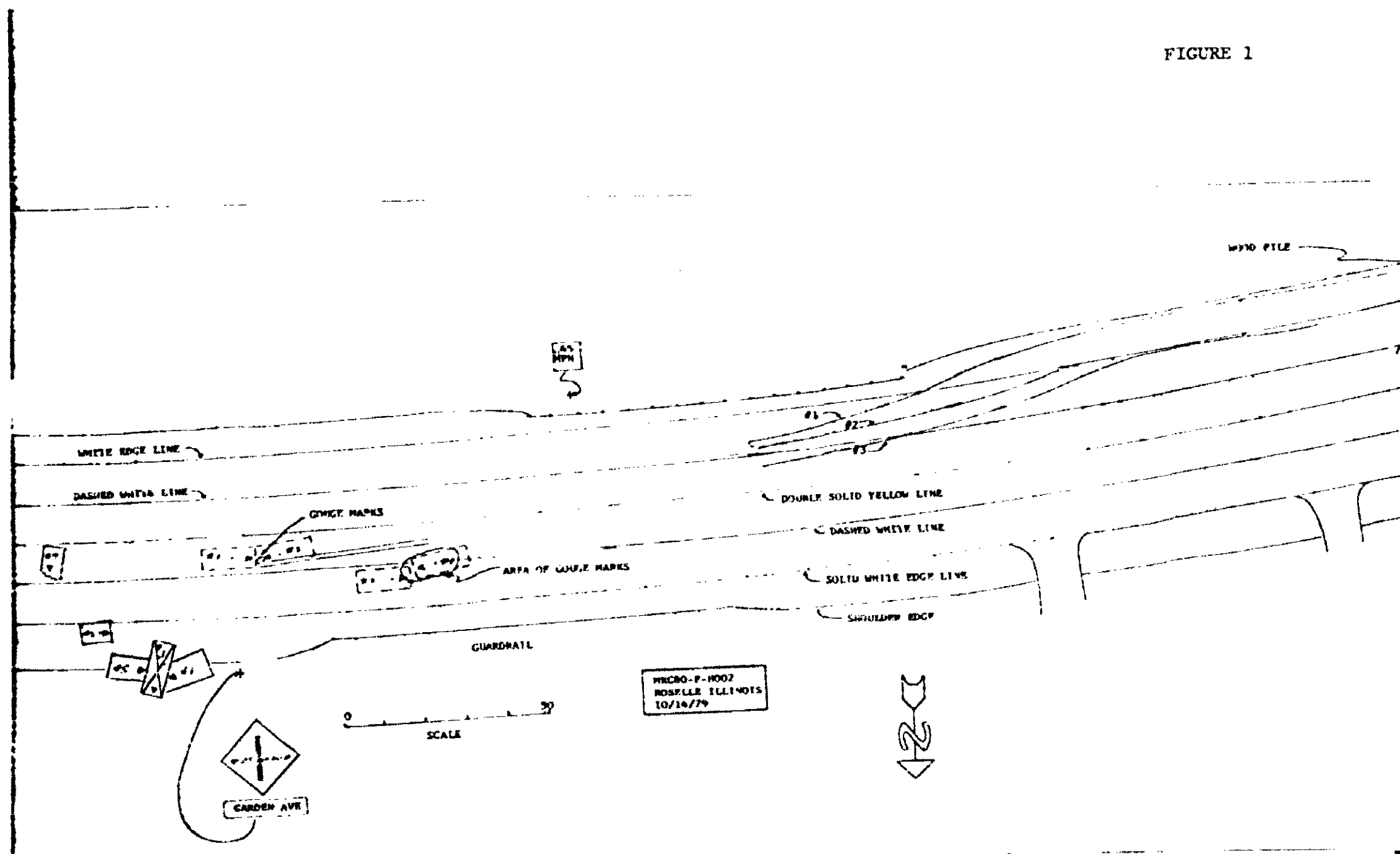
The blood alcohol content (BAC) of the Cadillac and Chevrolet drivers decreased their inhibitions, which probably resulted in their reckless vehicle operation and high speed. Also, this BAC level is known to result in loss of critical judgment, impairment of comprehension, increased reaction time and some muscular incoordination. All of this could have resulted in vehicle operation which appeared to be "reckless driving," but which still was the best possible. In the critical seconds before impact, alcohol impairment may well have been severe enough to prevent their avoiding the accident.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the operation of the 1974 Cadillac and 1966 Chevrolet by the drivers whose judgment and driving ability were impaired by alcohol. Contributing to the severity of the accident was the excessive speed of these two vehicles.

000019

FIGURE 1



000020

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H003  
DOCKET NO. HY-215-79

LOCATION: Interstate 10 at Milepost 540  
near Boerne, Texas

FACILITY/VEHICLE:

1. 1975 Peterbilt tractor with  
1976 Great Dane flatbed semitrailer  
Operator: Gregory Enterprises  
Carlsbad, New Mexico
2. 1970 2-door Mercury Cyclone  
Operator: Yolanda Reyna  
Leoti, Kansas

TIME: 0645

DATE: 10/17/79

PROPERTY DAMAGE: \$45,000 (estimated)

INJURIES: 5 FATAL

1 NONFATAL

0 NONE

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the fatigued truckdriver to keep his vehicle under control and avoid slower moving traffic in its proper lane ahead of him. Contributing to this failure was the truckdriver's dozing at the wheel.

000021

## INVESTIGATION

### The Accident

About 6:45 a.m. c.d.t. on October 17, 1979, a 1975 Peterbilt truck tractor towing an empty 40-foot-long 1976 Great Dane flatbed semitrailer was eastbound in the right-hand eastbound traffic lane of Interstate 10 near Boerne, Texas. A witness who was following the truck reported that its travel speed was 65 - 70 m.p.h. The truck was overtaking a 1970 2-door Mercury Cyclone GT which also was eastbound in the same travel lane at an unknown but lower speed than that of the truck. At about Milepost 540.1, the front of the truck impacted and began to override the rear of the Mercury. The Mercury's rear undercarriage components contacted the pavement, and its fuel tank ruptured, spilling gasoline along the highway. There was no fire. The two vehicles remained in physical contact throughout extensive postimpact travel. After impact, the vehicles veered diagonally to the left across the eastbound lanes, depressed grass median and westbound lanes, off the north edge of the highway and up an embankment. As the vehicles crossed the median, the degree of override increased. After topping the embankment, the truck tractor struck and broke a 6.5-inch-diameter overhanging limb from a Live Oak tree. In its turn, the Mercury struck, but did not break, the 11-inch-diameter tree bole. At or near this point of postimpact travel, the truck penetrated the Mercury's passenger compartment, and the Mercury began to disintegrate.

The Mercury struck a 19-inch-diameter tree bole, and the roof and right door were torn from the car, and one occupant was ejected. The Mercury was rolled underneath the No. 2 and 3 truck axles and the semitrailer. The truck came to rest facing east-northeast. The semitrailer remained attached to the truck tractor at the fifth wheel. The Mercury came to rest inverted under the semitrailer immediately in front of the No. 4 axle. It was nearly perpendicular to, and with the front oriented away from, the semitrailer.

Three of the five Mercury occupants were ejected during postimpact travel. The remaining two Mercury occupants were in the forward passenger compartment area of the inverted vehicle. The driver and four passengers of the Mercury died in the crash. The truckdriver sustained only minor injuries.

### Injuries to Persons

#### Injuries

#### Drivers

#### Passengers

	Truck	Mercury	Truck	Mercury
Fatal	0	1	0	4
Nonfatal	1	0	0	0
None	0	0	0	0

No chemical tests or autopsies were performed on any of the occupants of either vehicle. The investigating officer reported he observed no evidence of alcohol.

000022

### Driver Information

The truckdriver was a 29-year-old male. He held a valid Class 8 chauffeur license issued by the State of New Mexico with no restrictions. This class of license was valid for the type vehicle being driven. Since his employer operated in interstate commerce, he was subject to Federal Motor Carrier Safety Regulations. Dated January 12, 1979, his medical certificate was current. Employed by Gregory Enterprises since March 16, 1979, the truckdriver reported 10 years experience on the particular equipment.

The truckdriver's New Mexico driving record showed three previous convictions, all for speeding violations. These, as reported, were: (1) Speed 71-79 m.p.h. in a 55 m.p.h. zone on 2-15-77; (2) Speed 10-19 m.p.h. over the posted limit on 8-11-77; and (3) Speed 80-89 m.p.h. in a 55 m.p.h. zone on 5-16-79. No reports were received to verify involvement in any previous accidents.

The truckdriver had been off duty from October 11 to October 16, 1979. He said he departed Carlsbad, New Mexico between 10:00 p.m. and 10:30 p.m. m.d.t. en route to Houston, Texas. The driver's log entries indicated that before the accident the truckdriver drove about 428 miles in about 7-1/2 hours, with 3 stops totaling about 30 minutes.

A person who did not witness the accident but talked to the truckdriver shortly after its occurrence reported, "I talked to him several times. When I asked if he had fallen asleep, he replied that he must have done so."

The 16-year-old driver of the Mercury held a recently issued, valid Kansas driver license with no restrictions. Her Kansas driving record showed neither convictions for traffic violations nor previous accidents.

En route to Raymondville, Texas from their home in Leoti, Kansas to attend a relative's funeral, the Mercury occupants had traveled about 720 miles in the 17-3/4 hours from departing Leoti to the collision. There were three licensed drivers among the five Mercury occupants.

### Vehicle Information

The truck was a combination of a tractor and empty flatbed trailer. Both were owned by Gregory Enterprises of Carlsbad, New Mexico.

The tractor was a Model 359-ST cab-behind-engine, 1975 Peterbilt. It had an odometer reading of 436,392 miles. It was powered by a Cummins 6-cylinder diesel engine and equipped with magnesium wheels and steel belted tube-type tires of various makes. All 10 tires were inflated, with inflation pressure ranging from 70 - 91 p.s.i. Tread depths ranged from 8/32- to 16/32-inch. In the cab there was a lap belt for the driver's seat only. It was rolled up and taped to the floor next to the belt anchors.

000023

The trailer was a 40-foot-long 1976 Great Dane flatbed semitrailer. All 8 tires on the semitrailer were Michelin radial tube-type. Inflation pressures ranged from 73 - 92 p.s.i. and tread depths from 2/32- to 16/32-inch.

The automobile was a 1970 Mercury Cyclone 2-door sedan. It was owned by the mother of the driver.

#### Highway Information

Interstate 10 in the accident area is a four-lane, divided, limited access highway. A 9.5-foot-wide paved shoulder borders the eastbound traffic lanes on the outside. Lane widths are 12'5" and 11'6" for the outside and median lanes, respectively. The median shoulder is 3'9" wide. A 64.5-foot-wide depressed grass median separates opposing traffic. The lowest point in the median is 33 inches below the eastbound lanes and 35 inches below the westbound lanes. The westbound lanes have a 4'1" median shoulder, 11'9" median lane, 12'0" outside lane and 9'6" paved shoulder. The pavement is marked with lane lines but no edge lines. However, the shoulders are clearly delineated by use of a paving material of a lighter color than that used in the travel lanes.

#### Meteorological Information

The collision occurred at early dawn; nearly full darkness existed, and the roadway was unlighted. There was a 90 percent cloud cover but no precipitation. The road surface was dry.

#### ANALYSIS

Accident dynamics prevented computation of a realistic speed estimate. However, limited corroboration of the witness' estimate of the truck's speed can be found in evaluating travel times and distances. The driver's log indicated 7.25 - 7.75 hours en route with about thirty minutes total non-driving time. A travel distance of 428 miles in 6.75 - 7.25 hours indicates a 59 - 63 m.p.h. average speed. Some of the truck's travel was on other than interstate highways and involved passing through cities and towns with reduced speed zones. These factors indicate that the truckdriver probably was traveling well above 55 m.p.h. on Interstate 10 to maintain the average speeds indicated.

The Mercury occupants had traveled about 720 miles in about 17.75 hours. This constitutes an average speed of 40 - 41 m.p.h. Considering rest and refueling stops, this indicates the Mercury occupants traveled continuously since departing Leoti. With three licensed drivers in the vehicle, it is likely they intended driving straight through to Raymondville, Texas by rotating the driving task.

000024



Based on the witness' conversation with the truckdriver after the accident and the lack of any evidence of preimpact evasive action, it is probable that the truckdriver dozed while at the wheel and was not aware of the events or vehicle actions immediately preceding the accident.

The identity of the person driving the Mercury was based primarily on circumstantial evidence. There were three licensed drivers in the vehicle, two of whom were ejected. At final rest, the 16-year-old was in the driver area of the vehicle, and her 13-year-old sister was in the right front passenger area. The Mercury was equipped with front bucket seats with high seatbacks and a center console. These features would tend to retard occupants from being thrown about within the vehicle. Further, the position of Mercury components with respect to the truck configuration and to the postimpact travel path suggests that the Mercury disintegrated from the rear, progressing forward. This, in turn, suggests that rear seat occupants would be the first to be ejected from the vehicle. It is concluded that those ejected were riding in the Mercury's rear seat, and the front seat occupants remained in the vehicle, essentially in their respective preaccident positions. Thus, it is also concluded that the 16-year-old was driving the Mercury at the accident time.

The Mercury driver was a comparatively inexperienced driver. It may be that she also was fatigued from over 17 hours of travel. These factors suggest that she may not have been watching the rearview mirror as closely as she could have and may not have been aware of the truck overtaking the Mercury.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the fatigued truckdriver to keep his vehicle under control and avoid slower moving traffic in its proper lane ahead of him. Contributing to this failure was the truckdriver's dozing at the wheel.

000025

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. NYC-80-F-H001  
DOCKET No. HY-218-79

LOCATION: Freedom Plains Road near New York State Route 55  
LaGrange, New York

FACILITY/VEHICLE:

1. 1967 2-door Pontiac LeMans  
Operator: Cathy A. Morano  
Poughkeepsie, New York

TIME: 1230

DATE: 10/26/79

PROPERTY DAMAGE: \$600 (estimated)

INJURIES: 5 FATAL  
1 NONFATAL  
0 NONE

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the driver, whose judgment and driving ability were impaired by alcohol, to maintain directional control of her vehicle while attempting to negotiate a left curve.

000026

## INVESTIGATION

### The Accident

On the morning of October 26, 1979, a group of about 20 teenagers met at Baird Park Pavilion near LaGrange, New York, to celebrate the 18th birthday of one of their friends. About noon, when their supply of beer was depleted, six of the teenagers drove to a supermarket in nearby Apple Valley, New York to buy more beer. After buying two cases of beer, the group started back to Baird Park Pavilion to rejoin their friends.

The group traveled north along Freedom Plains Road in the driver's 1967 Pontiac LeMans. At 12:30 p.m., when the car was .4 miles south of LaGrange, the driver failed to negotiate a left-hand curve. (See figure 1.)

The right wheels ran off the pavement onto the gravel and earth shoulder of the two-lane asphalt paved road, leaving 165 feet of counter-clockwise yaw marks on the shoulder before returning to the pavement. The car continued across the road, ran off the left side and began a clockwise rotation until striking a three-foot diameter tree broadside after having traveled an additional 171 feet. The front end of the automobile, from the "A" columns forward, was torn from the rest of the vehicle and continued another 27 feet until it struck a second three-foot diameter tree headon.

Following the impact with the first tree, the three front seat occupants were ejected; the three back seat passengers were trapped in the wreckage and were not ejected. The driver and the center position, front seat passenger were killed, as were all three back seat passengers. The right front seat passenger sustained minor injuries only. None of the occupants was wearing any of the four available lap belts.

### Injuries to Persons

<u>Injuries</u>	<u>Driver</u>	<u>Passengers</u>
Fatal	1	3
Nonfatal	0	1
None	0	0

### Vehicle Information

The 1967 Pontiac LeMans, a two-door, six-passenger sedan, was owned by the driver. It was equipped with an eight-cylinder engine, an automatic transmission, power steering and power brakes. Initial vehicle-to-tree impact deformation was on the left side of the automobile at the driver's door, which bore the full imprint of the tree. The major

000027

displacement extended from the rocker panel into the roof and from the front edge of the door rearward into the quarter panel. Both the left door and roof were deformed inward to about the longitudinal centerline of the vehicle, with some rearward deformation of the quarter panel and roof toward the rear seat. The left ends of both the front and rear seats were buckled and displaced by the body-shell deformation.

Impact was sufficiently severe to cause the forward end of the automobile to separate completely from the rear at the "A" columns. Front end impact with the second tree extensively deformed the front bumper, grill, hood and radiator. Both left and right vehicle main frame rails broke off forward of the front seat near the base of the "A" columns.

#### Driver Information

The Pontiac driver, age 18, was the birthday celebrant. She was a recent graduate of the high school the other victims attended. She held a valid New York State, Class 6 driver's license with no restrictions. Up until the date of the accident, she held a Class 5 probationary license. The probationary condition of her license automatically changed on her 18th birthday, the day the accident occurred. A check of her driving record revealed no traffic violation convictions and no previous accidents.

#### Highway Information

Freedom Plains Road is a 2-lane, north-south, 20-foot-wide, asphalt-paved, winding country road. The northbound approach to the curve the driver failed to negotiate was on a moderate downgrade which leveled off in advance of the curve. The road was posted for a maximum legal speed of 55 m.p.h. In addition, there was an advance curve warning sign with an advisory speed plate indicating a safe speed of 40 m.p.h. The pavement was marked with white edgelines and double yellow centerlines.

#### Medical and Pathological Information

Postaccident toxicology tests revealed a 0.23 percent blood alcohol level for the driver. The New York State Vehicle and Traffic law states, "No person shall operate a motor vehicle while he has a 0.10 percent of alcohol in his blood as shown by chemical analysis of his blood, breath, urine, or saliva...."

#### ANALYSIS

There were no tire scuff marks on the pavement prior to the Pontiac's initial departure from the roadway. The scuff marks began on the gravel and soil shoulder at the right pavement edge, indicating that the automobile

000028

was in a gradual left turning maneuver and that it ran off the pavement as the driver negotiated the left curve. As the car continued along the shoulder, the rear wheels began to yaw outward, counterclockwise beyond the track of the front wheels as the driver tried to steer more sharply to the left to return to the road. After returning to the roadway, the right rear wheel continued to leave a yaw mark on the pavement to about the road centerline. The next visible tire scuff marks appeared in the soil of a residential driveway on the left side of the road and were indicative of a right turn maneuver, the marks having been made by the left wheels as the vehicle began to rotate clockwise. These marks continued to the area of impact with the first tree.

While trying to return to the roadway after running off the paved surface, the driver apparently overcorrected, first, in steering sharply left to return to the roadway and again, after running off the left side of the road. However, she was unable to regain control of the automobile before it struck the tree.

High impact speed, broadside impact with the tree, extreme deformation of the left side of the vehicle, and penetration into the passenger compartment provided little or no chance of survival even had the occupants been wearing the available lap belts. The right front seat passenger probably survived the collision because he was laterally farther from direct contact with the intruding vehicle body deformation, and the other front seat occupants cushioned him from those components.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the driver, whose judgment and driving ability were impaired by alcohol, to maintain directional control of her vehicle while attempting to negotiate a left curve.

000029

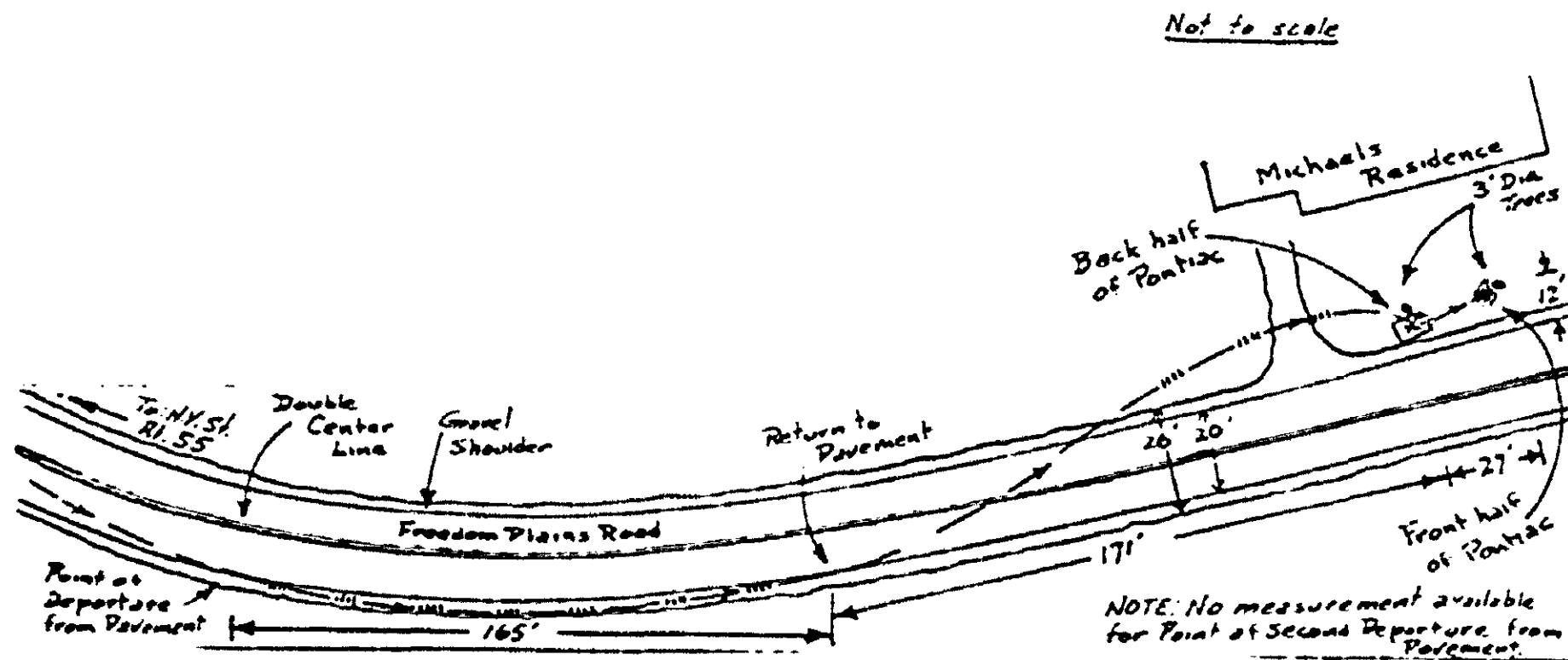


Figure 1

000030

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. ATL-80-F-H004  
DOCKET NO. HY-225-79

LOCATION: Georgia State Route 20 near Forsyth County Road 91678  
Cumming Georgia

FACILITY/VEHICLE:

1. 1966 2-door Chevrolet Impala  
Operator: Luther Ray Haney  
Lawrenceville, Georgia
2. 1977 2-door Chrysler Cordoba  
Operator: Marie Hazel Lingerfelt  
Canton, Georgia

TIME: 1905

DATE: 11/23/79

PROPERTY DAMAGE: \$30,000 (estimated)

INJURIES: 6 FATAL

1 NONFATAL

0 NONE

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was failure of the Chevrolet driver to maintain directional stability of his vehicle. Contributing to the accident were probable alcohol impairment of judgment and driving ability; poor vehicle component condition; unsafe vehicle modification; and inadequate road geometry.

000031

## INVESTIGATION

### The Accident

About 7:05 p.m. on November 23, 1979, a 1966 Chevrolet Impala was traveling westward on two-lane Georgia State Route 20 near Cumming, Georgia. According to a witness, who was driving a vehicle immediately preceding the Chevrolet, the Chevrolet passed his vehicle at an estimated speed of 70 to 75 mph, narrowly missing a headon collision with an eastbound vehicle. Immediately thereafter, the Chevrolet veered off the right edge of the pavement onto the dusty earthen shoulder, returned to the roadway, and then ran off the right edge again. The vehicle continued traveling on the shoulder, creating a huge cloud of dust. It reentered the roadway in a 2 1/2-degree lefthand curve but began to rotate counterclockwise and skid sideways diagonally across the roadway centerline into the path of an eastbound Chrysler Cordoba. The front of the Chrysler struck the right door and side area of the Chevrolet and continued to penetrate the front and rear passenger compartments; both vehicles came to an abrupt stop together in the eastbound travel lane.

All four Chevrolet occupants, the Chrysler driver and one of two Chrysler passengers died at the accident site; the right front seat passenger in the Chrysler sustained critical injuries. No one was ejected from either the Chevrolet or Chrysler, although no one was using the available occupant restraints.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>		<u>Passengers</u>	
	Chevrolet	Chrysler	Chevrolet	Chrysler
Fatal	1	1	3	1
Nonfatal	0	0	0	1
None	0	0	0	0

### Vehicle Information

The 1966 Chevrolet Impala was a 2-door coupe owned by the driver. It was equipped with an 8-cylinder engine, a manual transmission with the gear shift lever mounted on the steering column and rear air shock absorbers. Two of the Chevrolet's tires were substandard; the right front tire had no tread depth and the left rear very little. The rear of the Chevrolet was raised considerably higher than the front end. An expired North Carolina inspection sticker was affixed to the car's windshield, and a Georgia license plate issued for use on a 1967 Chevrolet stationwagon was used illegally on the Chevrolet.

000032



The 1977 Chrysler Cordoba was an 8-cylinder, 2-door hardtop owned by the driver's husband who was a rear seat passenger. The automobile's preaccident condition, including tires, was good.

Both vehicles were destroyed. Primary impact damage to the Chrysler was on the front end. On the Chevrolet the right side door was crushed inward; bumper and headlight indentations from the Chrysler appeared on the right side of the vehicle. Though the entire dash was destroyed, the odometer was readable; it registered 65 mph.

#### Driver Information

A resident of nearby Canton, Georgia, the female driver of the Chrysler was 53 years old. She held a valid Georgia operator's license, and her driver's record indicated no driving convictions or infractions during the preceding three years.

Postaccident body positions initially led investigators to conclude that a 16-year-old female Chevrolet occupant was the driver. However, investigation later proved her 20-year-old husband, the vehicle owner, was the driver. The two passengers seated in the rear were the driver's brother and stepbrother. Having lived in both Georgia and North Carolina, the driver was at various times licensed by both States. His driving history, beginning at age 15, was as follows:

Issuance of Georgia Learner's Permit	August 2, 1974
Issuance of Georgia Driver's License	August 31, 1977
Issuance of North Carolina Driver's License	March 1, 1978
Speeding citation (75/55) in North Carolina	August 31, 1978
Reckless driving citation (driving under the influence of alcohol-D.U.I.) in North Carolina	September 2, 1978
Reissuance of Georgia Driver's License	November 3, 1978
Suspension of North Carolina Driver's License	November 25, 1978
D.U.I. citation in Georgia	May 20, 1979
Citation and accident in Georgia (too fast for conditions)	September 28, 1979

000033

### Highway Information

Traversing Forsyth County, in which the accident occurred, Georgia State Route 20 was a 2-lane, east-west highway. In the immediate accident vicinity, the posted speed limit was 55 mph. Traveling westbound at this location, the highway curved to the left in a series of two connecting curves. The first one was 1.5 degrees with a descending grade of about 5 percent for a distance of 1356.7 feet. The second curve increased to 2.5 degrees, descending at 6 percent for a distance of 758 feet. The point of impact was at the lower and westernmost end of the second curve.

Each traffic lane was 12 feet wide, constructed of asphalt bound aggregate and bordered by solid white painted edgelines. The two lanes were separated by appropriately painted yellow traffic control centerlines. All were in good condition.

Each highway shoulder was about 10 feet wide, constructed of earth, sparsely covered with grass. Due to roadway pavement resurfacing, there was a variable 2- to 5-inch dropoff to the shoulder along the westbound right edge of pavement within the area of the compound curve.

Beginning 4,800 feet east of the point of impact and continuing westwardly, the direction traveled by the Chevrolet, the road was tangent with an ascending grade of 4.7 percent. About 4,500 feet from the point of impact, as it began to descend, the roadway turned 12 degrees sharply to the right for a distance of 546 feet before it became tangent and also began to level out, 3,400 feet from the point of impact. From this point, it continued tangent to the beginning of the compound curve which approached the accident site.

### Medical and Pathological Information

Postmortem analyses of the blood of the Chrysler driver and the female passenger in the Chevrolet, who initially was thought to be the driver, revealed negative and 0.08 percent blood alcohol levels, respectively. No blood samples were taken from any of the other victims. Both the front and rear occupant compartments of the Chevrolet were littered with full and empty beer cans.

### ANALYSIS

The Chevrolet Impala was mechanically unsound for operation on a public highway because of its poor tires and elevated rear suspension system. These factors, in combination with high speed, adverse highway conditions and geometrics, and the probable alcohol impaired condition of the driver, interacted simultaneously to influence the accident's occurrence.

000034

Several vehicle factors may have contributed to the accident. Some postcrash inspection of the destroyed vehicle was possible. Though inspection indicated no malfunction of the vehicle's mechanical systems, it revealed several other conditions which affected the driver's ability to control the car. The tread of the right front and left rear tires of the Impala was smooth; the tires lacked the tread depth that is important in providing the traction needed to prevent a car from skidding and rotating. The driver's modification of the air shock absorbers allowed him to raise the rear of his vehicle to an abnormal height, thus changing the vehicle's center of gravity and allowing additional lateral sway in the rear of the vehicle. This effectually reduced steering and handling effectiveness.

The institutional process of handling court cases failed to deal adequately with the driver who had a history of alcohol related offenses. Though Georgia and North Carolina maintained suitable motor vehicle records on the Impala driver, the overall system failed to evaluate and dispose effectively with the alcohol-related highway offenses which appeared on his record.

Even though North Carolina suspended the driver's license for three months, he was able to obtain a Georgia license before the effective date of North Carolina's suspension and thus legally to continue operating a motor vehicle under the authority of Georgia. Within nine months of the D.U.I. citation in North Carolina, the driver was cited for D.U.I. in Georgia. Plea bargaining (plea of "nolo contendere" allowed by Georgia law for first time D.U.I. offenders or one D.U.I. offense within a 5-year period) resolved the case with relatively light adjudication.

The accident appearing on his record for September 28, 1979, involved the driver's leaving the scene of the accident before the police arrived. This too was handled with considerable leniency. The charge of "Driving too fast for conditions" was the only citation issued, since the arresting officer was not aware that the driver was D.U.I. until the day following the accident and, therefore, could not prove such.

The environment element that possibly contributed to the cause of this accident included both the condition and geometrics of the highway. Such factors relate more adversely when a driver of a motor vehicle is in an alcohol-impaired condition.

Approximately 4,000 feet prior to the accident location, the driver of the Impala safely negotiated a 12-degree righthand curve. Considering that the driver was as alcohol-impaired in the 12-degree curve as in the less extreme compound curve indicates that although a driver may be impaired, other faults in the highway transportation system must be present for an accident occurrence.

000035

The section of highway subsequent to the 12-degree curve was straight with a partial downgrade. The geometrics at that location were conducive to speeding, so the Chevrolet probably accelerated through this area. When the vehicle approached the 1.5-degree lefthand curve and overtook and passed a slower moving vehicle, the driver's passing maneuver initiated loss of vehicle control. His failure to react properly resulted in running off the right edge of the pavement. When he steered left and reentered the travel lane, the highway curvature increased to 2.5 degrees. Again the driver failed to properly correct his steering, resulting in a second run-off. When he attempted to bring the vehicle back onto the roadway, it began to rotate counterclockwise and skid uncontrollably sideways across the centerline into the path of the oncoming Chrysler.

Although the two connecting curves, 1.5 degrees and 2.5 degrees, are not sharp or extreme, current design criteria consider compound curves undesirable because drivers are required to make a steering correction when traversing from one curve area to the next. Such a correction is oftentimes unexpected and results in the vehicle either crossing the centerline or leaving the right side of the roadway. This situation is more likely to occur if a vehicle traverses the curves at a high rate of speed.

Another environmental factor that may have caused the vehicle to rotate uncontrollably was the dropoff from the roadway edge to the shoulder. The dropoff was considerable and abrupt in the vehicle's reentry area. It is conceivable that this condition resulted in adverse impact forces when the right front wheel of the vehicle struck the exposed pavement edge.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was failure of the Chevrolet driver to maintain directional stability of his vehicle. Contributing to the accident were probable alcohol impairment of judgment and driving ability; poor vehicle component condition; unsafe vehicle modification; and inadequate road geometry.

000036

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H005  
DOCKET NO. HY-226-79

LOCATION: South Dakota Highway 37 at Milepost 84  
near Mitchell, South Dakota

FACILITY/VEHICLE:

1. 1956 Chevrolet Belair, 4-door sedan  
Operator: Dennis Lucid  
Letcher, South Dakota
2. 1977 Buick Skylark, 4-door sedan  
Operator: Verlynn Nelson  
Sioux Falls, South Dakota
3. 1974 Ford Torino, 2-door sedan  
Operator: Mark Frank  
Huron, South Dakota

TIME: 2217

DATE: 12/08/79

PROPERTY DAMAGE: \$5,000 (estimated)

INJURIES: 8 FATAL  
2 NONFATAL  
2 NONE

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the unsafe passing maneuver by the driver of the Ford whose judgment and driving ability were impaired by alcohol.

000037

## INVESTIGATION

### The Accident

At about 10:17 p.m. c.s.t. on December 8, 1979, a 1956 Chevrolet traveling north in the southbound lane collided headon with a southbound 1977 Buick. The Buick overturned and burned. Five of the six occupants of the Chevrolet died, as did three of the four occupants of the Buick.

On December 25, 1979, 17 days after the accident, an 18-year-old person from Huron, South Dakota committed suicide. His 16-year-old brother told police that his brother was the driver of a 1974 Ford which had been involved in the December 8, 1979 accident. He was a passenger in the Ford at the time. He said that on the night of the accident, he and his brother had each consumed six 12-ounce beers during the hour before the accident. They had driven to Mitchell and were on their way home when they passed the Chevrolet traveling north on a four-lane, divided segment of State Road 37. Then the Chevrolet passed the Ford; the Ford passed the Chevrolet again. As the Chevrolet passed the Ford a second time, someone threw out some food wrappers which struck the Ford's windshield. This angered the Ford driver, and he decided to throw a beer bottle at the Chevrolet. However, the highway narrowed to an undivided two-lane road prior to the beginning of the intended maneuver. The surviving brother stated that he commented that they had better not try to pass the Chevrolet at that time because another car was approaching, but the driver did not hear or ignored the warning and began to pass the Chevrolet to the right by driving on the asphalt shoulder. When the Ford was about 1/2 the length of the front fender ahead of the Chevrolet, the Ford bumped the Chevrolet, causing it to cross partly into the opposing lane. They saw the fire behind them and knew a collision had occurred, but they did not stop. They learned about the outcome of the accident later through newspaper and radio accounts of the accident.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>			<u>Passengers</u>		
	Chevrolet	Buick	Ford	Chevrolet	Buick	Ford
Fatal	1	1	0	4	2	0
Nonfatal	0	0	0	1	1	0
None	0	0	1	0	0	1

One passenger of the Chevrolet, a 15-year-old, survived the accident. He was seated in the right front seat position and was found partially ejected through the open door of the Chevrolet. He had a lacerated liver, lacerated spleen, fractured pelvis and other fractures of extremities.

Two passengers of the Buick were taken to a hospital in Sioux Falls, where one, a 13-year-old male, died in surgery. The survivor was a 9-year-old female who was sleeping in the rear seat of the Buick. The driver of the Buick and the right front passenger were extensively burned.

000038

### Vehicle Information

The 1956 Chevrolet Belair 4-door sedan was owned by its driver. Its VIN was VC56K073154, and its odometer indicated 24,785 miles, which is probably not the actual mileage for a vehicle that is about 13 years old. The vehicle was equipped with manual drum brakes, manual steering and manual transmission converted to a floor shift. The vehicle had a rigid one-place steering shaft and non-energy-absorbing steering column. There were no passenger restraints and no instrument panel padding. This vehicle was manufactured before the initiation of FMVSS 208, occupant restraints. The vehicle suffered extensive contact damage to the left half of its front end and three-fourths of its left side. Induced damage deformed the right side window pillars and the right front of the vehicle. Both frame rails were severely distorted. The left front wheel was moved rearward, 4 feet 4 inches. Sideswipe-type contact damage extended to the left rear wheel which was displaced rearward 4 inches.

Mechanical inspection of the Chevrolet revealed deficiencies in the vehicle's control systems. The tire types were mismatched, front to rear. Front tires were steel-belted radial ply tires, and the rear tires were standard bias ply tires. This is the most undesirable combination of tires possible. Brake drum-to-lining clearance on three wheels (one could not be accurately measured due to crash damage) was excessive, thus brake pedal travel would tend to be excessive. Brake pedal travel could not be checked directly due to crash damage. Brake drum diameter was excessive on the three that were measured. The drum surfaces were smooth, and brake service had been performed in July. The drums had been turned in excess of recommended limits for passenger cars by the brake repair shop. The effect of the excess diameter is twofold. The drums are weakened due to removal of material and therefore cannot resist internal pressure from the brake shoes as adequately as they should. And, the drum mass is reduced so that their heat-absorbing capacity is not sufficient to resist brake fade. Finally, the muffler and exhaust pipes were perforated with rust holes.

The 1977 Buick Skylark 4-door sedan was owned by the driver and his wife. Its VIN plate was destroyed in the fire was was its entire instrument panel area. The vehicle was equipped with automatic transmission, power steering and power brakes.

Mechanical inspection was limited due to the extensive fire damage to the Buick. Mechanical portions of the steering system were intact. The brake system could not be inspected or tested, but this vehicle left full braking skid marks just prior to impact. Tires were all radial ply tires, but all other information was obliterated by the fire. There were no modifications to the vehicle.

000039

Direct contact damage was severe, and the vehicle was extensively burned. Induced damage was confined to the front bumper, roof and right fender. The steering shaft telescoping device prevented intrusion of the passenger space, even though the left front wheel and left front frame member were displaced 3 feet 8 inches rearward into the toe board. The energy-absorbing device and steering column shear capsules functioned as intended. The steering column was fully collapsed.

After the crash, the car was resting on its roof and a small fire erupted in the engine area. The fire, fed by fuel draining from the fuel tank through the crushed fuel pump housing, was intense, with flames as high as 25 feet, according to witnesses.

The 1975 Ford Torino 2-door sedan was owned by the driver. This vehicle was not inspected because its identity was unknown until 17 days after the accident, and the owner had already attempted body repairs.

#### Driver Information

The driver of the Chevrolet was 17 years old and held a valid South Dakota driver license with no restrictions. His driving record had no evidence of any traffic convictions or previous accidents.

The driver of the Buick was 44 years old and held a valid South Dakota driver license with no restrictions. His driving record was void of any evidence of traffic convictions or accidents.

The driver of the Ford was an 18-year-old and held a valid South Dakota driver license with no restrictions. His driving record was not determined.

If the statement concerning the consumption of six 12-ounce cans of beer by the 160-pound driver of the Ford within an hour before the accident is true, it is estimated that he would have had a blood alcohol level (BAL) of about 0.16.

#### Highway Information

South Dakota Highway 37 is a two-lane asphalt highway near milepost 84 and northward. The traveled portion of the roadway was 24 feet wide with an 8-foot-wide asphalt shoulder on each side. At the accident site, the road curves to the right when going north, with a radius of approximately 22,000 feet. The road is painted with 4-inch-wide white, reflectorized edgelines which were in good condition. There was a broken yellow centerline which was in fair condition. Nighttime visibility of the roadway was excellent.

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### ANALYSIS

From the witness' statement of his own travel speed, the lower limit of the Chevrolet's speed is an estimated 50-60 m.p.h. Assuming this to be true and considering the proximity of the point the Chevrolet crossed the centerline and the point of accident, the Buick driver had between 1 and 1.2 seconds to perceive and respond to the imminent danger. Braking skidmarks leading to the point of collision attest to his reaction.

Using his brother's statement of alcohol consumption, the Ford Torino driver's blood alcohol content at the time of the accident is estimated about 0.16 percent. The American Medical Association typifies this blood alcohol level with loss of critical judgment and minor incoordination of voluntary muscle control. The descriptors accurately describe the driver's actions in that he lost his temper and attempted an irrational act in a dangerous situation. Final evidence of his lack of judgment was his decision not to stop after the accident.

### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the unsafe passing maneuver by the driver the driver of the Ford whose judgment and driving ability were impaired by alcohol.

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NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H006  
DOCKET NO. HY-227-79

LOCATION: Portland Avenue at the Soo Line Railroad crossing  
White Bear Lake, Minnesota

FACILITY/VEHICLE:

1. 1970 Ford F250 pickup truck  
Operator: Kari Mondale  
White Bear Lake, Minnesota
2. Soo Line Railroad freight train  
Operator: Soo Line Railroad Company  
Minneapolis, Minnesota

TIME: 1330

DATE: 12/09/79

PROPERTY DAMAGE: \$1,000 (estimated)

INJURIES: 2 FATAL

1 NONFATAL

4 NONE

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the driver of the Ford to detect the presence of the approaching train due to inattentiveness to the driving task.

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## INVESTIGATION

### The Accident

About 1:30 p.m. on December 9, 1979, the driver of a 1970 Ford pickup truck, southbound on Portland Avenue in White Bear Lake, Minnesota, drove onto the Soo Line Railroad tracks at a witness-estimated speed of 30 m.p.h. in front of a westbound freight train. The lead locomotive struck the left side of the Ford's passenger compartment, fatally injuring the driver and center-seat passenger. The right-front-seat passenger was seriously injured. None of the train's four crewmembers was injured.

At the time of accident, the train was being operated at an estimated speed of 45 m.p.h., with its headlamp and flashing amber lights operating and its horn blowing. Witnesses reported that the cantilevered signal lights at the crossing were flashing as well.

Following impact, the train dragged the Ford westward about 1,530 feet, before it could stop. None of the Ford occupants was ejected from the vehicle.

The only survivor in the Ford stated that as the truck approached the crossing, the vehicle's radio was on loud, the vehicle occupants were talking and listening to the radio and they were unaware of the approaching train.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>		<u>Passengers</u>	
	Ford	Train	Ford	Train
Fatal	1	0	1	0
Nonfatal	0	0	1	0
None	0	1	0	3

### Vehicle Information

The 1970 Ford Model F250 pickup truck owned by Mr. James E. Hall was equipped with a 4-wheel drive and a 4-speed manual transmission and was powered by a V-8 engine. The vehicle appeared to be well-maintained. All 4 tires were Firestone Town & Country Tubeless, size 12-165LT, with tread depth ranging from 7/32 to 13/32 inch. In the cab, the front seat was a bench-style seat. There were no occupant restraints. It was equipped with a camper shell. An AM/FM stereo radio was installed.

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Damage to the Ford consisted primarily of penetration of the locomotive drawbar into the left front of the cab, between the front axle and the firewall. The frame was severely bent. The passenger compartment maintained its integrity. The windshield and rear window of the cab were broken out. The door windows had been rolled down prior to the accident. The lightweight aluminum camper shell was not securely fastened into position on the pickup bed and was thrown clear at impact.

Postcrash inspection showed the radio was tuned to FM92, a popular music station, with the volume knob turned almost one complete clockwise rotation.

The 81-car Soo Line freight train No. 733 was pulled by 4 locomotive units, the lead of which was a General Motors, Model GP-40, diesel-electric locomotive manned by an engineer and front brakeman. The lead locomotive was being operated with the short hood facing forward. Headlights were mounted in the center of the leading end of the locomotive, about 14 feet above the rails. A rotating amber light was also mounted in the center of the locomotive, directly above the cab. The horn, a Leslie 5-chime whistle, was facing the direction of movement.

#### Driver Information

The driver of the Ford was a 19-year-old female resident of White Bear Lake, Minnesota. She held a valid Minnesota driver license with no restrictions.

The locomotive engineer was a male employed by the Soo Line Railroad Company.

#### Highway Information

Portland Avenue is a north-south street. In the vicinity of the crossing, just north of White Bear Lake, it is tangent with a slight ascending grade on the southbound approach. Road alignment provides an excellent view of all existing signals, signs and pavement markings. The road has a 22-foot-wide asphalt-type surface and 5-foot-wide gravel shoulders.

Traffic control consists of yellow dashed lane lines, with no-passing zones marked by a solid yellow line for about 570 feet on the north approach and 470 feet on the south approach. An active railroad crossing signal warns motorists when trains are approaching the crossing. This signal has double roundels mounted on a post and cantilevered over the roadway. Each light has a lens facing north and south, providing 8 flashing lights to each approach. Additional crossing warning is provided by an advance "RXR" symbol painted on the pavement 270 feet and a standard "RR" advance warning sign posted 575 feet in advance of the crossing. In addition, a 30 m.p.h. speed limit sign is in place about 1,000 feet north of the crossing. All signals, markings and signs were in excellent condition.

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Approaching the crossing, the driver of a vehicle southbound on Portland Avenue has an almost unobstructed view of westbound train movements. When a vehicle is within 160 feet of the crossing, its driver can see a distance of 230 feet eastbound along the railroad right-of-way. Drawing nearer to the crossing, this view is partially obscured for two short distances by 2 groupings of evergreen trees located between 65 and 135 feet west of the road. These trees are on private property.

#### Railroad Information

The train detectors that activate the warning light signals at Portland Avenue are located 1,650 feet east and west of the crossing. This spacing provides Portland Avenue traffic a 25-second warning for a train traveling the prescribed 45 m.p.h.

The whistle post to alert engineers of westbound trains to begin sounding their horns is located 1,100 feet east of the crossing. This distance would permit the train horn to be sounded for about 17 seconds prior to its entering the crossing.

The maximum speed limit on the Soo Line Railroad is 45 m.p.h. for this portion of track.

#### Meteorological Information

The skies were clear, and the temperature was about 35 degrees at the time of the accident. The sun was west of the south heading of the center of the road.

#### ANALYSIS

At the time of the accident, the angle of the sun to roadway would have caused a southbound driver some discomfort but would not have obscured the flashing lights on the signal. The trees in the background of the signals would have helped accentuate the flashing lights.

The flashing lights of the railroad crossing signal were visible more than 600 feet north of the crossing, more than an adequate distance for a vehicle traveling at 30 m.p.h. to come to a stop prior to the crossing. If the pickup were traveling at the posted speed limit of 30 m.p.h., and the train at 45 m.p.h., the signals would have activated when the pickup was 1,100 feet north of the crossing.

The statement of the survivor indicates that none of the vehicle occupants observed any of the warning devices or the train itself. This was probably due to their attention being focused on their conversation and the radio.

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The National Transportation Safety Board determines that the probable cause of the accident was the failure of the driver of the Ford to detect the presence of the approaching train due to inattentiveness to the driving task.

000046

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H007  
DOCKET NO. HY-229-80

LOCATION: East Roanoke Drive near 37th Street  
Kansas City, Missouri

FACILITY/VEHICLE:

1. 1974 International schoolbus  
Operator: KAL Lines, Inc.  
Kansas City, Missouri

TIME: 1600

DATE: 12/14/79

PROPERTY DAMAGE: \$25,000 (estimated)

INJURIES: 0 FATAL

7 NONFATAL

30 NONE

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the inability of the schoolbus driver to maintain proper control of the vehicle. Contributing to driver inability were the combined effects of inhibited steering capabilities and alcohol impairment of judgment and driving ability.

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## INVESTIGATION

### The Accident

On December 14, 1979, a KAL Lines, Inc. bus driver in an International schoolbus picked up one adult bus monitor and 36 students at an elementary school in Kansas City, Missouri, then drove about 2 1/4 miles to another elementary school to pick up additional students. As the bus traveled north along Wyoming Street in Kansas City, the right front tire of the bus began to transfer molten rubber onto the asphalt pavement. Weaving an erratic path, the trail of rubber transfer continued uninterrupted to a point about 120 feet from the accident site. The path the bus followed was north on Wyoming Street, a 45-50 degree right curve onto West Roanoke Drive, another 40-45 degree right turn onto 37th Street, and a 90 degree right turn onto East Roanoke Drive, on which street the accident occurred. (See figure 1.)

The bus monitor reported that the bus driver drove away from the first school as if in a hurry and was driving fast while en route to the second school; she said the schoolbus was late in arriving at the first school. From her seat on the right side toward the rear of the bus, the monitor stated, she smelled the odor of burned rubber as the bus approached the second school. She further reported that once or twice she shouted to the bus driver to slow down.

A school crossing guard who was stationed in front of the second school as the bus approached reported hearing a passerby say, "That bus looks like it is on fire." She turned and saw the bus approaching with smoke trailing. She stated that she thought of trying to slow the bus but discarded the idea because of the high speed of the bus and concern for what might occur. She stated, "And as he got closer I could smell fire burning, as it came by me going real fast around the corner."

The schoolbus continued past the crossing guard to the intersection of 37th Street and East Roanoke Drive. The driver made the 90 degree right turn; the bus swerved right toward the west curb, then veered to the left, running off the east edge of the road at an obtuse angle. The right front of the bus struck a 15-inch-diameter tree bole located about 11.5 feet east of the pavement edge. The bus came to rest at impact. Impact with the tree prevented the bus from descending a steep hillside.

The bus monitor stated that the bus driver remained seated after impact. The monitor opened the rear emergency door and helped students from the bus. After exiting, the students ran from the bus, some to their homes and others to the school. All reported injuries were minor.

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### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>	<u>Passengers</u>
Fatal	0	0
Nonfatal	0	7
None	1	30

### Vehicle Information

The schoolbus was a 1974 International Loadstar 1600, Model 1603 chassis, VIN 13662DHA45729. The body was Ward Model SM-29, SN-63096, 44-passenger. The bus was painted schoolbus yellow and had standard markings and lights. It was equipped with a 4-speed manual transmission, 8-cylinder engine, power-assisted brakes and power-assisted steering. There was a lap belt in the driver's position only; the belt was not used.

Tree impact was at the right chassis rail. The bumper bracket was sheared and pushed rearward. Maximum crush was at the upper right front fender.

Maintenance records showed the bus had undergone a complete service check on November 12, 1979, at mileage 44,369. The odometer reading when inspected postcrash was 45,213. The bus motor had been rebuilt on June 20, 1979, and other work orders showed routine maintenance and repairs at about 2-week intervals since September 1, 1979. Postcrash inspection showed no deficiencies in the bus' steering, brakes, power train, glazing, doors, fuel system or interior. The bus' tailpipe was rusted and broken off at the right rear wheel area.

The bus had nearly new tires on the steering axle and four recapped tires on the rear axle. All tire tread depths and inflation pressures were within acceptable limits.

Postcrash inspection showed damage to the extreme right front bumper which could not be associated with the tree impact. There were blue-gray paint transfers on the bumper. The right end of the bumper was pushed 10 inches rearward and was contacting the outer tread shoulder on the right front tire. The shoulder was eroded as frictional heat caused a reversion in the rubber. There was a circular area on the bumper face which was seared and devoid of paint.

### Driver Information

The 20-year-old schoolbus driver held a valid, Missouri chauffeur's license with no restrictions which was valid for operating schoolbuses. The State of Missouri requires only a chauffeur's license to operate a schoolbus; such license may be issued to any qualifying person who is at least 18 years old. The bus driver's record showed one violation; speeding on November 7, 1977.

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Employed at KAL Lines, Inc. since September 19, 1979, the driver had a record of previous schoolbus driving experience. KAL Lines, Inc. provided the bus driver six hours training; one hour in class and five hours in a bus. The company Safety Officer accompanied him on two days for route familiarization and observation. On October 27, 1979, the bus driver completed a required six-hour defensive driving course.

#### Highway Information

East Roanoke Drive is a 2-lane, 2-way city street. The 20.25-foot-wide pavement has no striping or markings. On either side of the street is a 2-foot-wide concave drain gutter. Thirty-seventh Street has the same pavement width and gutter configuration. The two streets meet at a 90-degree "T" intersection. There are no signs or pavement markings at the intersection, but a W-section guardrail protects the dead-end side of the intersection.

East Roanoke Drive is tangent to a point about 108 feet south of its intersection with 37th Street, then curves to the right. Along the east side of East Roanoke Drive is a steep hillside covered with sparse trees and shrubbery. About 6 feet east of the road, the hillside begins sloping downward at an angle of about 45 degrees for almost 150 feet to level ground below.

In addition to the rubber transfer on Wyoming Street, West Roanoke Drive and 37th Street, a rubber transfer and tire scuff were found along the west edge of East Roanoke Drive beginning 66 feet and ending 77 feet south of 37th Street. From here, there were 3.9-foot-long dual tire braking scuffs leading to the final rest position of the left rear tires. There were also 5-inch-long burn marks with rubber transfer under the right rear dual tires at final rest.

#### Medical and Pathological Information

The bus driver had no known or reported medical abnormalities; he reported to the police that he was neither ill nor hurt after the accident. Results of a breathalyzer test administered 1-1/2 hours after the accident showed a blood alcohol content of more than 0.13 percent.

#### ANALYSIS

The schoolbus was involved in a collision prior to this accident, as evidenced by the damaged bumper and the blue-gray paint transfer on the bumper face, indicative of a collision with another motor vehicle. This damage played a significant role in the events which led to the bus' running off East Roanoke Drive into the tree.

The rubber transfer began on Wyoming Street, about 35 feet north of the 90 degree "T" intersection, after the schoolbus made a turn from an east-west street onto Wyoming Street, proceeding north from the intersection. From the intersection, the rubber transfer was continuous to the intersection of 37th Street and East Roanoke Drive. The path of the mark testified to erratic steering. Headed north along Wyoming Street, it varied in lateral movement from within two feet of the east curb to left of the roadway center. There were no 90-degree turns between the two above-mentioned "T" intersections. The schoolbus continued north to the second school, then rounded a curve at the

000050

school. At one point, the right front tire mounted a sidewalk on the right side of the road. The curves which the schoolbus rounded did not require substantial steering, curving only 45-50 degrees. However, the 90-degree right turn onto East Roanoke Drive required steering input sufficient to "pop" the right front tire from behind the damaged bumper; hence the end of the rubber transfer. The damaged bumper then kept the tire from returning to a straight-ahead alignment and maintained a right turn steering lock on the bus as indicated by a transfer mark about 70 feet south of the intersection. The bus driver apparently was steering hard left in an effort to straighten out and keep the bus on the road, as the tire suddenly "popped" back in behind the bumper and the steering axle immediately was in a hard left turn lock which carried the bus across and off the road before the driver could take corrective action. Tire scuffs leading to the left rear dual tires' final rest positions indicate that the driver did apply brakes an instant before hitting the tree.

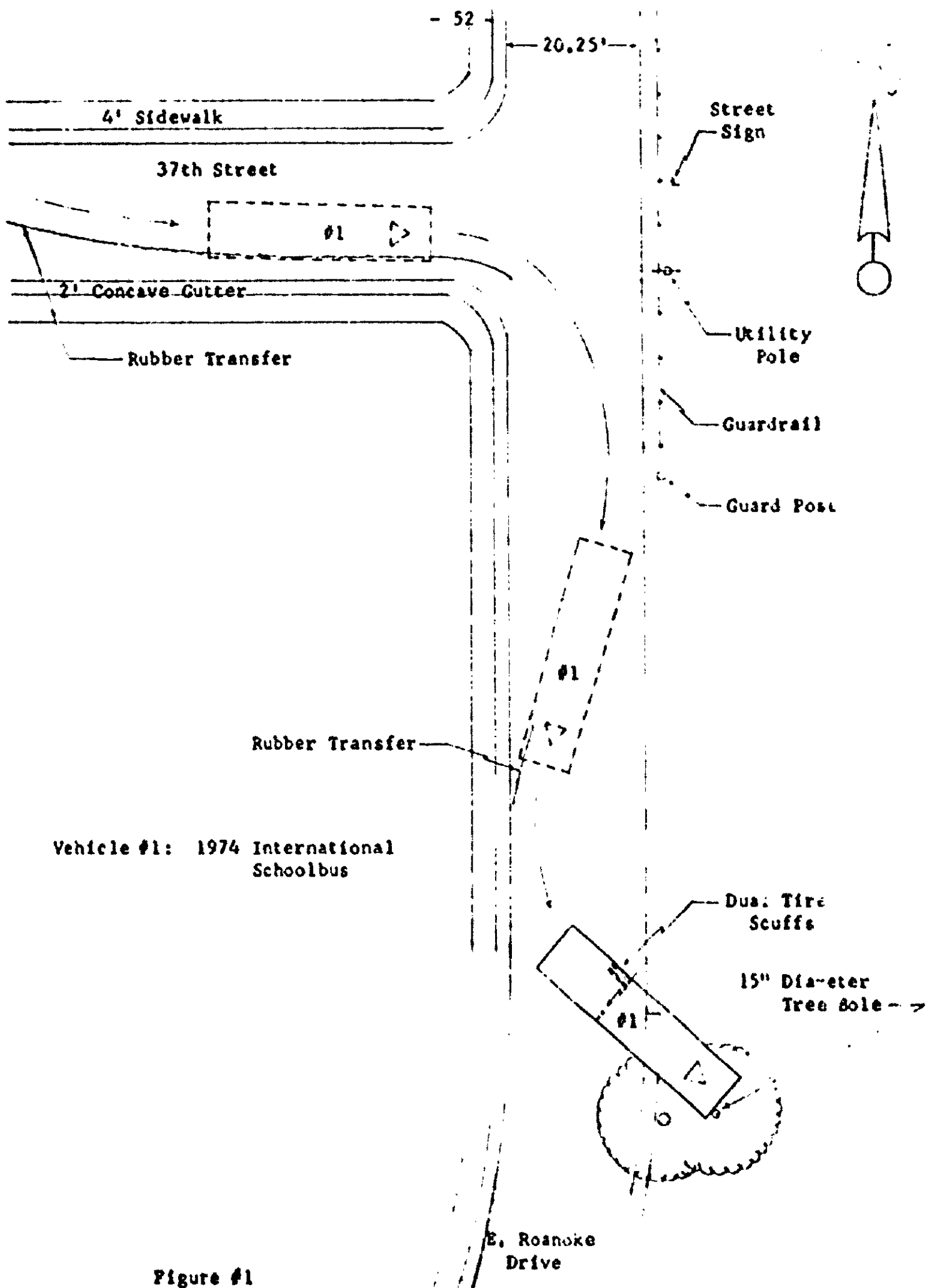
The erratic path of the rubber transfer over about 1-1/4 miles of road evidences the bus driver's inability to maintain lateral stability in the road at a time when the effects of the bumper would have been minimal. The driver's judgment and driving ability were adversely affected by alcohol.

Both factors, the previously induced bumper damage and intoxication, contributed to the bus driver's inability to maintain control of the bus.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the inability of the schoolbus driver to maintain proper control of the vehicle. Contributing to driver inability were the combined effects of inhibited steering capabilities and alcohol impairment of judgment and driving ability.

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NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H008  
DOCKET NO. HY-230-80

LOCATION: Santa Fe Lake Road at the Atchison, Topeka and Santa Fe  
Railway Company railroad  
near Augusta, Kansas

FACILITY/VEHICLE:

1. 1977 Oldsmobile Cutlass 442  
Operator: Mike Lonberger  
Douglas, Kansas
2. General Electric, Model V23B, Type B-B locomotive-powered  
freight train  
Operator: The Atchison, Topeka and Santa Fe Railway Company

TIME: 0017

DATE: 12/22/79

PROPERTY DAMAGE: \$30,000 (estimated)

INJURIES: 6 FATAL  
0 NONFATAL  
4 NONE

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the failure to the Oldsmobile driver to recognize the existing hazard at the railroad highway grade crossing in time to bring his vehicle to a safe stop. Contributing to that failure were the dense fog and the driver's imprudent travel speed.

000053

## INVESTIGATION

### The Accident

At about 12:17 a.m. on December 22, 1979, 6 occupants of a 1977 Oldsmobile Cutlass 442 were en route to a dance in Wichita, Kansas from a Christmas party in Augusta, Kansas. Traveling south along Santa Fe Lake Road in dense fog, the vehicle approached a railroad grade crossing at a speed estimated to be at least 50 m.p.h.

Concurrently, an Atchison, Topeka and Santa Fe Railway Company (ATSF) freight train was eastbound, moving over the crossing at Santa Fe Lake Road at a recorded 48 m.p.h. The Oldsmobile underrode and struck the side of an empty boxcar, the 30th car behind the locomotive. The boxcar siderail penetrated the Oldsmobile's windshield area, and the following boxcar trucks impacted the forward right side of the automobile. The Oldsmobile rotated counterclockwise and was dragged 168 feet along the train's path. The automobile came to rest facing northeast, parallel to and between the mainline and a siding. Two of the six occupants were ejected. All six were killed.

The railroad boxcar derailed at the crossing. A piggyback flatcar with two highway semitrailers was behind the boxcar; it also derailed. Both cars continued eastward about 0.3 mile before exiting the south side of the trackbed; they struck a concrete shed containing railroad signal equipment and came to rest in a shallow gully.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>		<u>Passengers</u>	
	Oldsmobile	Train	Oldsmobile	Train
Fatal	1	0	5	0
Nonfatal	0	0	0	0
None	0	1	0	3

### Vehicle Information

The 1977 Oldsmobile Cutlass 442, two-door sedan was owned by the driver. It was equipped with an 8-cylinder motor and automatic transmission. It had bucket, highbacked seats and a center console in front. Interior padded components included the upper instrument panel, steering wheel hub and spokes, visors, armrests and integral head restraints. There were two lap-shoulder belts in front and two lap belts in the rear seat, but no occupant restraint was used. All four tires were Goodyear Cushion Tread Steel Belted Radial. Tread depths ranged from 4/32 to 7/32 inch. There were 18 psi inflation in each rear tire; crash damage destroyed the front tires, preventing measurement.

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The forward half of the Oldsmobile was torn apart. All front-end steering components were destroyed, and there was severe forward chassis distortion. There were blue paint transfers from the boxcar on the vehicle's roof. Secondary impact was evidenced by a yellow paint transfer.

Interior damage was similarly severe. The most severe passenger compartment intrusions occurred at the left-front roof area and right firewall.

The 88-car freight train was pulled by 2 General Electric, Model V23B, type B-B locomotives, manned by an engineer and head brakeman. Damage to the boxcar from automobile impact was superficial. The resulting derailment caused more severe damage to the boxcar, following piggy-back car, tracks, signal equipment and shed.

#### Driver Information

The 25-year-old male Oldsmobile driver did not hold a valid operator's license. A license issued in 1975 expired December 13, 1978, and there is no record of his being issued an operator's license since that date. His driving record included one previous accident, five convictions for moving traffic violations, four of which were for speeding, and completion of a driver improvement clinic on February 16, 1977. The driver lived in Douglas, Kansas and frequently drove to Augusta. The route upon which he was traveling to Wichita also was the most direct route between Douglas and Augusta.

There were no known medical problems which may have rendered the Oldsmobile driver incapable of safely operating his vehicle. The host of the party the Oldsmobile driver attended stated that the driver had been drinking during the evening but did not appear to be intoxicated when he left the party. A blood sample taken from the Oldsmobile driver was improperly cared for and could not be analyzed for blood-alcohol content. No autopsies were performed.

The locomotive engineer was operating the train from his position on the right side of the lead locomotive; the head brakeman was on the left side. The remaining two crewmembers were in the caboose.

#### Highway Information

Santa Fe Lake Road is a 21-foot-wide, two-lane, asphalt county road. A broken yellow centerline delineates the tangent north- and southbound lanes. The crossing at the ATSF tracks is rough, sufficiently so a passenger car attempting to traverse the crossing at 30 m.p.h. would experience severe suspension jouncing, and its undercarriage components could contact the crossing surface.

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In addition to the center stripe, the southbound lane had a railroad crossing pavement marking centered about 190 feet north of the crossing. The paint was faded, and the northernmost painted bar was partially covered by an asphalt patch. The marking was clearly recognizable in daylight but not so easily seen during darkness or under other vision-limiting conditions. A Railroad Advance Warning Sign was posted about 930.5 feet north of the north siding rail. About 610.75 feet from this rail, a "Bump" warning sign with a 20 m.p.h. advisory speed sign was posted. The crossbucks were about 15 feet north of the closest rail. All railroad crossing warning signs and pavement markings were in compliance with the Manual on Uniform Traffic Control Devices (MUTCD) recommendations. The same signs and markings also were along the northbound approach to the crossing. There were two street lights at the crossing, one mounted on a utility pole 80.5 feet north of the crossing and 25 feet east of the pavement, and the second south of the crossing on the same side. The speed limit was 55 m.p.h.

A postcrash inspection of Santa Fe Lake Road revealed preimpact skidmarks of 210.9 feet from the right tires and 196.4 feet from the left tires of the Oldsmobile. These skidmarks were straight and indicated no preimpact rotation from the Oldsmobile. About 31 hours after the accident, the skidmarks were still discernible, but faint and intermittent. By comparison, other marks at the scene were badly faded the following morning, within 24 hours of being made.

#### Meteorological Information

At the time of the accident the sky was overcast and there was heavy fog in the area. The temperature was 32 degrees F; the dewpoint was 32 degrees F, and the relative humidity was 100 percent. The wind was calm. There was no precipitation, but the road surface was wet due to fog condensation.

Visibility was limited by fog. Both headend train crewmembers estimated visibility at 30 - 60 feet. Police officers responding to the accident scene stated that 40 m.p.h. was about the maximum speed which could be safely traveled because of fog density.

#### ANALYSIS

The most direct route from the Christmas party to the accident site would be west on U.S. 54, through Augusta to Santa Fe Lake Road, then south on Santa Fe Lake Road to the railroad grade crossing. This route also was part of the most direct route from Augusta to the Oldsmobile driver's residence, so it likely was the route taken. Further, there were indications that the Oldsmobile driver was very familiar with the road.

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Although the Oldsmobile left about 211 feet of preimpact brake marks, there were no positive indications of what induced the Oldsmobile driver to apply the brakes. Allowing 1.5 - 2.0 seconds for perception-decision-reaction time, the vehicle would have been 320 - 400 feet from impact when its driver started the brake application. The fog conditions extant leave some doubt as to whether the Oldsmobile driver could have seen the train from that distance. The "Bump" warning sign was 610 feet north of the crossing.

The Oldsmobile driver had been at a party for several hours and during that time had been consuming alcoholic beverages. There is no evidence as to the quantity or type of alcoholic beverage consumed, however.

Investigating police officers described the road surface as being "... damp" when they were at the scene. The ambient temperature and dewpoint were both 32 degrees F, but there was no precipitation and no indication of icing on the pavement. The pavement was smooth, except for areas of patching. There had been no precipitation reported in the area for at least 21 days prior to the accident. The accumulation of grime could have combined with the moisture from fog condensation to produce a low friction coefficient. No skid numbers were available for the road surface, but it is estimated that the dynamic friction coefficient at the time was probably between 0.30 and 0.50. The rapidity with which the skidmarks faded also attest to a comparatively low friction coefficient.

The travel speed of the Oldsmobile was difficult to estimate because its at-impact velocity could not be computed. The Oldsmobile underrode the boxcar, then was immediately impacted by the boxcar's rear truck traveling at a different vector. These factors made it impossible to calculate the Oldsmobile's at-impact speed using available formulae. Investigative experience, coupled with observation of frontal impact crush on the Oldsmobile, suggest a probable impact speed of 20 - 40 mph. Using these figures with the estimated coefficient of friction results in a speed range of 48 - 69 mph. By eliminating both extremes, the travel speed range of 50 - 65 mph was estimated.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the Oldsmobile driver to recognize the existing hazard at the railroad highway grade crossing in time to bring his vehicle to a safe stop. Contributing to that failure were the dense fog and the driver's imprudent travel speed.

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NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H010  
DOCKET NO. HY-231-80

LOCATION: U.S. 79 near County Road  
near Jewett, Texas

FACILITY/VEHICLE:

1. 1976 GMC High Sierra pickup  
Operator: Bobby Lee Radeke  
Jewett, Texas
2. 1973 Pontiac Grand Prix two-door sedan  
Operator: Karon Johnson  
Dallas, Texas

TIME: 0700

DATE: 01/17/80

PROPERTY DAMAGE: \$12,000 (estimated)

INJURIES: 5 FATAL  
0 NONFATAL  
0 NONE

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the pickup driver's driving on the left side of the road as he approached a blind hillcrest, coupled with his failure to clear the oncoming traffic lane when he saw the approaching sedan. Contributing to the cause of this accident was the failure of the sedan driver to take appropriate avoidance action. Contributing to the severity of this accident were the speed at which the vehicles converged and failure of any vehicle occupants to use available restraints.

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## INVESTIGATION

### The Accident

On January 17, 1980 at about 7:00 a.m., a 1973 Pontiac Grand Prix was traveling southwestward on U.S. 79, en route from Dallas, through Buffalo, to Hearne, Texas. At the same time, a 1976 GMC pickup truck was traveling northeastward on U.S. 79 toward the driver's place of employment near Buffalo.

The pickup was left of center and traveling at an estimated speed of 65 mph when it topped a hillcrest directly in the path of the Pontiac. There were uncorroborated reports that the pickup was passing a tractor-semitrailer, but this could not be substantiated.

The vehicles collided in the southwest-bound lane. At impact, the right front of the Pontiac contacted the right-front corner of the pickup. The pickup rotated counterclockwise as the Pontiac penetrated the right side of the cab. The pickup came to rest about 21 feet southwest of the point of impact. Deflected to the right, the Pontiac came to rest about 23 feet west of the point of impact.

One of the dual fuel tanks attached to the pickup's chassis rails was crushed and breached at impact. Gasoline ignited and burned the pickup cab and motor compartment. A smaller fire in the forward end of the Pontiac was extinguished by a nearby resident and a passing schoolbus driver.

Both pickup occupants and two of the three Pontiac occupants died at the accident scene. A third Pontiac occupant died en route to a hospital in Dallas.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>		<u>Passengers</u>	
	Pontiac	Pickup	Pontiac	Pickup
Fatal	1	1	2	1
Nonfatal	0	0	0	0
None	0	0	0	0

### Vehicle Information

The 1976 GMC High Sierra 25, 3/4-ton pickup truck was owned by the driver. It was equipped with an 8-cylinder engine, automatic transmission, power-assisted front-disc and rear-drum brakes and power-assisted steering. Purchased secondhand in September 1979, the pickup had twin fuel tanks mounted on the right and left chassis rails, placed so that half of each tank was under the cab and half under the pickup bed. The fuel tanks were factory-installed, optional equipment. Neither of two available seat-belts was in use by the occupants.

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Contact damage extended along the cab's right side from just behind the front bumper of the B-pillar. Maximum crush into the right cab was about 27 inches. Body mounts separated, and the cab shifted left. As the right rocker panel and lower B-pillar collapsed, they crushed the forward half of the right fuel tank against the right chassis rail. Static crush reduced the tank's width from its original 12 inches to about 3 inches. The fuel tank ruptured, and spilled gasoline ignited during engagement and postimpact travel. Fire destroyed the cab and engine compartment, as well as rubber brake lines and other combustible components on the vehicle's undercarriage.

The 1973 Pontiac Grand Prix 2-door sedan was owned by a relative of the driver. It was equipped with an 8-cylinder engine, automatic transmission, highback front bucket seats, power-assisted front-disc and rear-drum brakes and power-assisted steering. Interior padding included the upper instrument panel, steering wheel hub and spokes, visors, door panels, armrests and integral head restraints. There were two lap/shoulder belts in front and two lap belts in the rear seat. None of the restraints was in use.

Primary damage extended across the Pontiac's front. There was secondary impact damage to the vehicle's left door and left quarter panel. Motor mounts separated, and the engine was displaced rearward causing moderate intrusion into the passenger compartment at the toe pan and firewall. The roof buckled in front of the B-pillars. The windshield shattered. The instrument panel was torn apart, and upper panel padding was torn off. There was evidence of heavy occupant contact to the windshield and instrument panel.

#### Driver Information

The 25-year-old driver of the pickup held a valid Texas operator's license with no restrictions. His Texas driving record showed no convictions for moving traffic violations but indicated involvement in one previous accident, a collision with another motor vehicle on December 19, 1979.

The 65-year-old driver of the Pontiac held a valid Texas operator's license which was restricted to corrective lenses. It was not determined whether he was using corrective lenses at the time of the accident. His driving record listed six convictions for moving traffic violations, five of which were for speeding, in a 35-month period. No previous accidents were listed.

Neither driver had any known physiological disorder which would have rendered him incapable of safely operating his respective vehicle. No autopsies were performed, nor were any toxicological tests made.

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### Highway Information

U.S. 79 was a straight, two-lane asphalt highway and the most direct route between Jewett, and Buffalo, Texas. There were no horizontal curves between the two towns, but there were numerous hills. Pavement width was 25.7 feet, with a 7.3-foot-wide asphalt shoulder on the northwest side and a 8.0-foot-wide asphalt shoulder on the southeast side. There were no edgelines, but lighter-colored pavement surfaces clearly delineated the shoulders. Highway striping consisted of a center stripe, partial barrier no-passing lines, and where appropriate, full barrier lines. All lines were yellow and clearly visible. In addition to the centerlines, there were reflectorized, raised pavement markers immediately outside and between the lines. The speed limit was posted at 55 mph.

The collision occurred about 290 feet northeast of a hillcrest. The length of the hillcrest was 900 feet, with a 5.6 percent grade on the northeast side and 2.9 percent grade on the southwest side.

There were no discernible preimpact tire marks left by the Pontiac. The pickup left preimpact skidmarks, the longest of which was 174.5 feet long and was left by the vehicle's right rear tire. There were marks from all four tires which were characteristic of the counterclockwise rotation. The right rear skidmarks began 9 inches southeast of the full barrier lines in the northeast-bound lane. Most of the pickup's width was left of center when preimpact skidding began.

It was estimated that the pickup was traveling at about 65 mph as it crested the hill. The speed of the Pontiac was calculated to be about 60 mph.

### ANALYSIS

Though the allegation that the pickup was passing a tractor-semitrailer combination when the accident occurred could not be corroborated, two conditions indicate that this may have been the situation: 1) location of the pickup, left of the center when its tires began leaving skidmarks on the pavement; and 2) the preimpact skidding dynamics of the pickup. These factors suggest a left-turn steering input immediately prior to the beginning of the skid. The expected reaction of a driver meeting oncoming traffic while left of center on a two-lane highway would be to return to the proper travel lane. The position and geometry of the initial 50 feet of the right rear skidmark suggest that the pickup driver may have attempted such a maneuver. However, he then steered left and braked hard. A possible explanation for the driver's actions would be the presence of an obstacle, in the form of another vehicle, in the northeast-bound travel lane. The left turn may have been an attempted escape maneuver.

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Analysis of the hillcrest curve and sight distance show that each driver could have clearly seen the other vehicle when the vehicles were separated by 650-700 feet and about 4.0-4.5 seconds before impact. The pickup used about 2.7 seconds while skidding 174.5 feet. Allowing 1.5 seconds for perception/decision/reaction time indicates that the pickup driver perceived the Pontiac's presence very near the earliest possible perception point. Absence of Pontiac skidmarks attests to one or more of the following by the Pontiac driver: 1) no, or delayed, perception of the pickup's presence, 2) no, improper or inadequate avoidance action, or 3) misinterpretation of the pickup driver's intent. Had the Pontiac driver perceived danger near his earliest point of possible perception and reacted with a comparatively hard brake application, the collision may not have occurred. Any substantial reduction of the Pontiac's speed would have had a significant effect in mitigating the severity of this accident.

This accident was not survivable under the existing circumstances, but might have been for the Pontiac occupants had they properly used the available restraints. Though intrusion into the Pontiac's passenger compartment was significant, there was sufficient space for survival if the occupants had been securely restrained. The pickup burst into flames immediately after impact. Though the pickup occupants were not using restraints, the fire may have rendered use of restraints academic in terms of lifesaving potential.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the pickup driver's driving on the left side of the road as he approached a blind hillcrest, coupled with his failure to clear the oncoming traffic lane when he saw the approaching sedan. Contributing to the cause of this accident was the failure of the sedan driver to take appropriate avoidance action. Contributing to the severity of this accident were the speed at which the vehicles converged and failure of any vehicle occupants to use available restraints.

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NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. ATL-80-F-H005  
DOCKET NO. HY-232-80

LOCATION: South Cobb Drive near Oakdale Road  
near Smyrna, Georgia

FACILITY/VEHICLE:

1. 1975 Chevrolet Model CE66803 cargo tank truck  
Operator: Lance Oil Company, Inc.  
Smyrna, Georgia

TIME: 1330

DATE: 01/31/80

PROPERTY DAMAGE: \$25,000 (estimated)

INJURIES: 1 FATAL  
0 NONFATAL  
0 NONE

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was failure of the right rear truck spring assembly that resulted in loss of vehicle control. Contributing to the spring assembly failure were the continuous loading of the truck in excess of the manufacturer's certified weight limitation and an inadequate company vehicle maintenance program.

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## INVESTIGATION

### The Accident

About 1:15 p.m., on January 31, 1980, a Lance Oil Company 2-axle, cargo tank truck, fully loaded with 2,705 gallons of gasoline, left Smyrna, a suburb of Atlanta, Georgia, to make two local deliveries in the Atlanta metropolitan area.

About four miles from Smyrna, the truck, occupied only by the driver, was traveling south on 7-lane South Cobb Drive, approaching traffic lights at successive intersections. It passed through one intersection and was slowing for another when the spring leaf assembly on the right rear axle of the truck failed. The radius spring leaf pulled free from the assembly, allowing the right side of the rear axle to move rearward. As the axle moved rearward, one of the hydraulic brake lines to the right rear wheel was torn away and the inside tire on that wheel locked against the truck frame. At that time, the truckdriver lost vehicle control.

Out of control, the truck continued south on the highway, with the front veering to the left and the rear to the right. It overturned to the right side in the two westernmost lanes. The front of the truck overturned 360 degrees, coming to rest on its front wheels, while the rear of the truck, with cargo tank, rotated 270 degrees, coming to rest on its left side, resulting in chassis frame twisting of 1/4 turn. The rear of the truck rested on the southbound shoulder, and the front extended southeastward across the two adjacent southbound traffic lanes.

The fill pipe was torn from the truck fuel tank during the overturn; fire erupted immediately and engulfed the cab in flames when the vehicle came to rest. Gasoline spilled from the five fill caps of the cargo tank, and fire spread on the pavement to a nearby intersection. Fire destroyed the truck and the overhead traffic lights at the intersection. The driver was fatally burned inside the truck cab.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>	<u>Passengers</u>	<u>Others</u>
Fatal	1	0	0
Nonfatal	0	0	0
None	0	0	0

### Vehicle Information

The truck, a 1975 2-axle Chevrolet Model CE66803 cargo tank truck, was owned and operated by Lance Oil Company, Inc. of Smyrna, Georgia. It was equipped with a V-8 gasoline engine, manual transmission, hydraulic brakes and a five-compartment, 2,705-gallon-capacity cargo tank. The rear axle was equipped with spring leaf assemblies, dual tires and dual brake cylinders at each wheel.

000064



The certified GVWR of the truck chassis-cab was 24,260 pounds--front axle 8,100 pounds; rear axle 16,160 pounds. The GVWR of the vehicle was not recertified when the cargo tank was installed. The cargo tank was loaded to full capacity when the accident occurred. The gross weight was 31,432 pounds--front axle 8,064 pounds; rear axle 23,368 pounds. The gross weight was 7,172 pounds heavier than the vehicle's certified GVWR. The rear axle was loaded 7,208 pounds more than the maximum weight permitted on that axle by the manufacturer's certification.

Fire destroyed the truck beyond repair; approximately 800 gallons of the cargo were recovered. The truck cab and engine were totally destroyed, and the cargo tank was severely damaged.

The undercarriage at the rear of the truck sustained less fire damage than did the front. The spring assembly on the right rear axle was equipped with a single auxiliary spring leaf mounted above the main assembly. All of the spring leaves, with the exception of the five main leaves and the radius leaf, were thrown onto the roadway during the accident. The two U-bolts that secured the spring assembly remained around the axle. Only half of the auxiliary spring leaf was recovered. Postcrash inspection of the recovered portion of the auxiliary leaf revealed a heavily rusted fracture area where the other half broke away.

The rear wheels of the truck were equipped with hydraulic brakes operated by upper and lower brake cylinders at each wheel. Two steel hydraulic brake lines to each rear wheel originally extended from a flared tube and nut attachment on the rear axle differential housing to similar connections at the wheel brake cylinders. The brake lines extended parallel, one above the other, along the backside of the rear axle and passed just outside the spring assembly U-bolts. The upper brake line to the right rear wheel was bracketed to the rear axle housing between the U-bolts and the differential housing. Both lines to the right rear wheel were torn away at the differential housing during the accident but remained attached at the wheel. The upper line broke away from the bracket on the axle housing and was separated into four links; the lower line remained in a single link. Three of the four separated links of the upper brake line were recovered. Postcrash inspection revealed a circumferential fracture in one link of the broken upper line; the fracture extended to half the circumference of the 1/4-inch tube.

#### Driver Information

The 37-year-old male truckdriver was a resident of Atlanta, Georgia. He held a valid Class 1 Georgia Drivers License authorizing him to drive automobiles and small trucks. Georgia requires a Class 4 License to operate a truck with a gross weight in excess of 14,000 pounds, such as the truck being operated in this accident. The driver's record in the State of Georgia revealed the following information:

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09/26/68 - Lane Violation  
06/16/70 - Traffic Control Device  
05/07/71 - Speeding 72/65  
05/14/73 - Speeding 105/65  
05/14/73 - Speeding 110/50  
08/29/76 - Speeding 72/55  
06/20/79 - Speeding 49/35

#### Highway Information

South Cobb Drive is a north-south highway located on the outskirts of Atlanta, Georgia. It connects the suburban cities of Marietta and Smyrna with Atlanta.

The accident occurred on a tangent section of almost level roadway in the southbound lanes of South Cobb Drive between intersecting Kenwood Road and Oakdale Road. Traffic is controlled at the two intersections by synchronized traffic signal lights suspended above each lane of South Cobb Drive. The distance between the two intersections is 533 feet. The roadway consists of a 96-foot-wide bituminous pavement. A 12-foot-wide traffic lane in the center of the roadway, marked for turning traffic only, separates three 12-foot-wide through-lanes in each direction. Two-foot-wide cement gutters and five-inch-high curbs abut the pavement at each outer edge. Twelve-foot-wide grass shoulders and steel guardrails parallel the curbing. At the time of the accident the roadway was dry. The posted speed limit was 55 mph.

#### Other Information

The components of the spring assembly that failed and the broken lengths of steel brake tubing to the right rear truck wheel were inspected after the accident. The auxiliary spring leaf had been broken near the center. The broken auxiliary leaf revealed a heavily rusted fracture area. When that leaf was assembled to the upper metal blocks and U-bolts that secured it to the main spring assembly, the metal block above the leaf was deformed to a shape that closed the void space left by the missing half of the leaf. A portion of spring assembly center bolt was sheared and remained inside the bolt hole of the radius spring leaf; a similar portion of the same bolt was sheared and remained inside the second leaf above the radius. The remaining length of the center bolt was intact. Grooved areas matching the thickness of the spring leaves marked the outside of the entire length of the center bolt. The inside areas of both U-bolts, the surface of the U-bolts that originally abutted the spring leaves in the assembly, were grooved to a size matching the thickness of the spring leaves.

The broken lengths of the upper steel brake tubing to the right rear wheel were placed together in their original position around the backside of

000066

the U-bolts. The curvature of the small length of tubing that suffered the circumferential fracture matched the curvature of the U-bolt it crossed. The circumferential fracture of the tubing occurred near where it passed over the right inside U-bolt. At the fracture area, the tubing was pressed flat.

Lance Oil Company had no procedure or schedule for servicing the truck, and no preventive maintenance was conducted. According to the company dispatcher, each driver was required to visually inspect his truck each day and report any defects found. The driver of the accident-involved truck inspected his truck on the day of the accident and reported no defects. The only vehicle maintenance records retained by Lance were copies of paid repair invoices. The spring U-bolts on the truck were retorqued in February 1979, and new rear brake drums and brake shoes were installed in August 1979. The mechanics who performed the spring and brake repairs said that the single auxiliary spring on the right rear spring assembly was in place, not broken at that time.

The truck manufacturer's service manual states: "U-bolts must be kept tight at all times to hold axle in place. Otherwise, axle may shift, causing misalignment; also, spring leaf failure in the vicinity of the spring center bolt could result."<sup>1/</sup>

#### ANALYSIS

At the time of the accident, the truck was loaded 7,121 pounds in excess of its certified GVWR and 7,208 pounds in excess of the maximum load permitted on the rear axle where the spring assembly failed. According to the truckowner, the truck had regularly operated with the cargo tank fully loaded since its purchase in 1975. The continuous overloading very probably caused the auxiliary spring leaf of the spring assembly to break in half sometime prior to the accident. The truckowner relied solely on his truckdrivers to inspect the trucks each day, and they had not reported the broken spring leaf.

At some undetermined time prior to the accident, the right rear auxiliary spring leaf fractured inside the U-bolt securement, and half of the leaf was released from the assembly. Since that time, forces from the load on the right rear axle were transferred through the remaining half of the auxiliary spring leaf, causing an imbalance of forces through the spring assembly to the rear axle. Continued operation caused the spring assembly to become loosened inside the U-bolts and to shift fore and aft about the axle. At the same time, the separate spring

<sup>1/</sup> GMC Truck Service Manual X-7133, Section 4B, page 161.

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leaves were abrading the center bolt that held the leaves in horizontal alignment. During operation, the shifting U-bolts contacted the upper steel brake line to the right wheel, causing that line to flex fore and aft. Constant flexing of that brake line resulted in the circumferential fracture that was found in the line at postcrash inspection. The U-bolt securement of the spring assembly continued to deteriorate until the radius leaf was released from the assembly. Misalignment of the rear axle followed, resulting in the loss of vehicle control and overturn.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was failure of the right rear truck spring assembly that resulted in loss of vehicle control. Contributing to the spring assembly failure were the continuous loading of the truck in excess of the manufacturer's certified weight limitation and an inadequate company vehicle maintenance program.

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NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H011  
DOCKET NO. HY-233-80

LOCATION: Texas State Road 35 at milepost 0  
near Van Vleet, Texas

FACILITY/VEHICLE:

1. 1963 Ford Galaxie  
Operator: Linda Parker McCray  
address unknown

TIME: 0200

DATE: 02/03/80

PROPERTY DAMAGE: \$500 (estimated)

INJURIES:	<u>5</u>	FATAL
	<u>0</u>	NONFATAL
	<u>0</u>	NONE

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the driver to maintain the Ford in its traffic lane. This failure was due to alcohol impairment of judgment and driving ability. Contributing to vehicle rollover and the severity of casualties was the buried-end guardrail.

000069

## INVESTIGATION

### The Accident

On February 3, 1980, at an undetermined hour during the night, an eastbound 1963 Ford Galaxie with five occupants went off Texas Highway 35 just before reaching a bridge over Linwood Creek, near Van Vleck, Texas. As the car left the north edge of the roadway, the right wheels overran the first four feet of a buried-end guardrail. The car passed behind the guardrail and rolled as it continued across a grassy bank, coming to rest inverted in about four feet of water. All five occupants drowned. (See figure 1.)

The car was not discovered until about 4:00 p.m. the same day, because only the rear wheels and the fuel tank were visible above the water's surface, and they were almost under the bridge.

There were no witnesses, and residents near the scene did not hear the accident take place.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>	<u>Passengers</u>
Fatal	1	4
Nonfatal	0	0
None	0	0

### Vehicle Information

The 1963 Ford Galaxie four-door sedan was owned by a sister of the driver, also the right front seat passenger. It was equipped with automatic transmission, power steering and power drum brakes.

Damage to the Ford was minor, consisting of dents in the left front and rear doors and dents in the roof. These dents were in the exterior sheet metal; there was no significant passenger compartment intrusion at the doors. The interior roof height was reduced about ten inches at the center, but adequate room remained to move about and sit upright in the seats. Exterior crush to the doors was four to six inches, and the roof crush was twelve inches at the center. There was no damage to underbody parts during the accident.

Except the left-front-door window, all windows were intact. The left-front window was missing before the accident, and the opening was partly covered by a piece of cardboard box inserted into the door slot. The right-front door window was rolled down. All other windows and vents were closed. Mechanical inspection revealed some minor discrepancies but no failures of essential control components.

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### Driver Information

The 30-year-old female driver of the Ford held a valid Texas operator's license with no restrictions. She had 14 years driving experience and no history of driving violations. The whereabouts and activities of the driver and other occupants before the accident were unknown.

A blood sample from the driver was analyzed by the Texas Department of Public Safety. The driver had a blood alcohol level of 0.19 percent by weight. The carbon monoxide analysis indicated less than 5 percent of saturation, an insignificant level.

### Highway Information

Texas Highway 35 is an arterial two-lane asphalt highway with unlimited access. In the area of the accident, the road passed through a rural area, with four-to-six residential driveways per mile. The speed limit is 55 mph.

The accident site was about 190 feet east of the Brazoria-Matagorda County line at a bridge over Linwood Creek. The roadway was straight and level for 2.9 miles leading to the accident site. The roadway was somewhat elevated from its surroundings, with approximately 4:1 side-slopes on each side beyond the 10-foot-wide gravel shoulders. The asphalt paving was 24 feet wide, and the lanes defined by the white edgelines and broken yellow centerline were 11 feet 6 inches wide. The white edgelines and centerline were bright and easily visible when illuminated by headlights of a vehicle. The bridge approach was protected on both sides by guardrails extending 50 feet from the bridge with turned-down and buried ends. The guardrails were installed in accordance with the standards of the American Association of State Highway Officials. <sup>1/</sup>

### Other Information

Off-road tiremarks from the automobile began 78 feet 10 inches from the bridge at the north shoulder edge; 11 feet 11 inches from the north edgeline. The vehicle's left-front and left-rear wheels were tracking in line at this point and indicated a departure angle of 5.8 degrees. As the vehicle continued forward and began to travel on the grassy side slope, the left-front and left-rear-wheel tracks began to separate. The maximum separation was 6 feet 2 inches, just before the vehicle became airborne over the creekbank, indicating a clockwise rotation of 41 degrees with respect to the roadway. At final rest, the inverted vehicle was approximately 42 feet from the beginning of the bridge. The nose of the car was facing north, and the rear wheels were directly under the north edge of the bridge. (See figure 1.)

<sup>1/</sup> A Policy on Geometric Design of Rural Highways, 1965, American Association of State Highway Officials, p. 243.

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### ANALYSIS

According to the American Medical Association's report, Alcohol and the Impaired Driver, a blood alcohol level of .19 percent will cause mild-to-severe muscular incoordination, loss of critical judgment and decreased sensory response. The depressant effect of alcohol and the nighttime occurrence of the accident make it possible that the driver became drowsy. The vehicle's gradual departure from the straight road in a normal tracking attitude also indicates a lack of critical recovery activity on the part of the driver.

The roadway and its delineation for night driving were adequate. The road shoulder was smooth and nearly level. There were no features which would have tended to cause the vehicle to leave the road and none which would have prevented recovery once the vehicle entered the road shoulder. However, as the vehicle departed the shoulder, the buried end of the guardrail allowed the right wheels to ramp up the guardrail and contributed to the vehicle's rolling over. This may have contributed to the fatalities because the passengers may have been able to escape the vehicle had it remained upright.

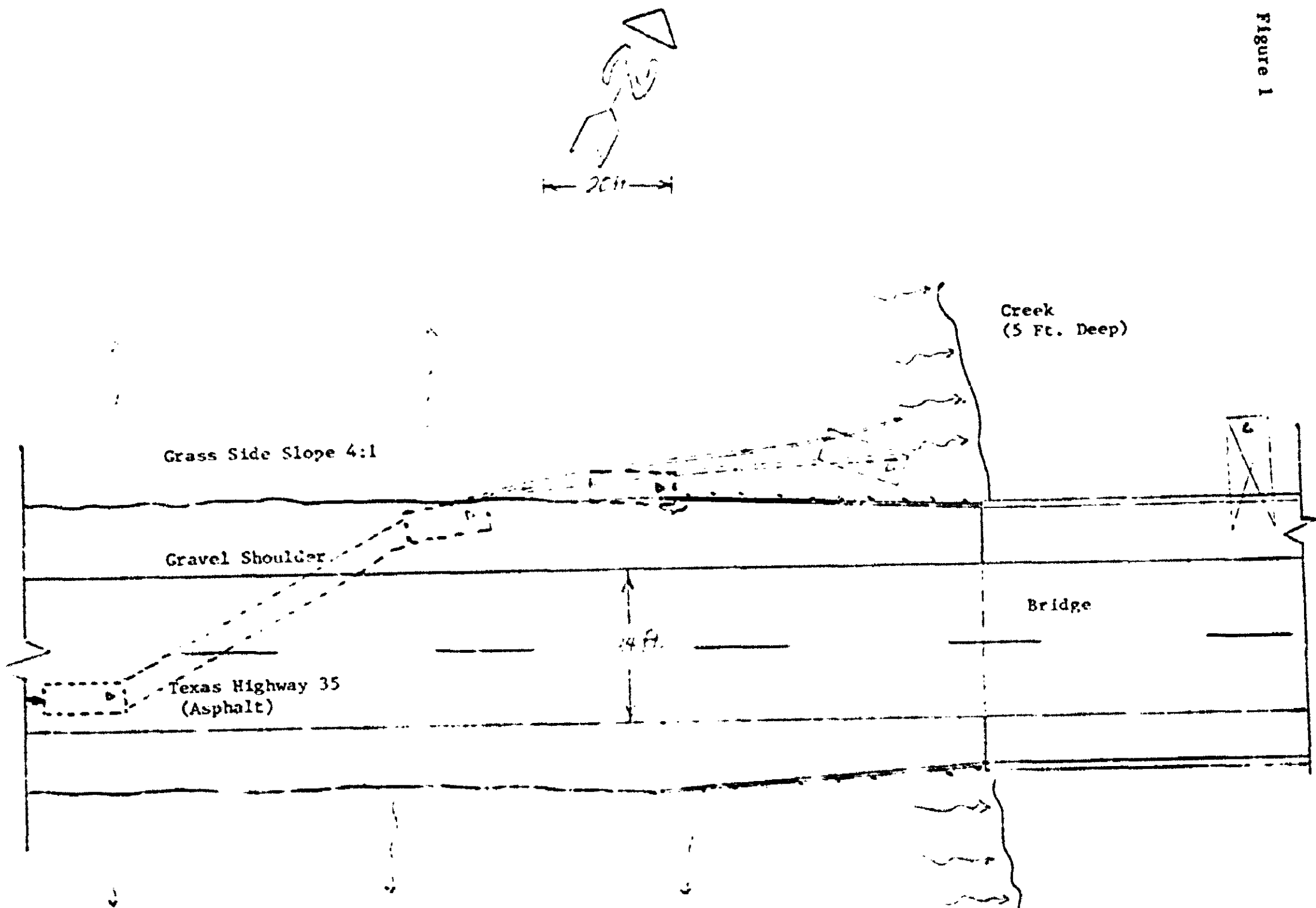
### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the driver to maintain the Ford in its traffic lane. This failure was due to alcohol impairment of judgment and driving ability. Contributing to vehicle rollover and the severity of casualties was the buried-end guardrail.

000072



Figure 1



000073

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H009  
DOCKET NO. HY-235-80

LOCATION: U.S. 167 near milepost 2.48  
near Junction City, Arkansas

FACILITY/VEHICLE:

1. 1977 Ford Econoline van  
Operator: Union County Center for the Handicapped  
El Dorado, Arkansas
2. 1977 Mack tractor  
1976 Fruehauf dump-body semitrailer  
Operator: Century Ready-Mix  
Monroe, Louisiana

TIME: 0800

DATE: 01/14/80

PROPERTY DAMAGE: \$6,000 (estimated)

INJURIES: 4 FATAL  
3 NONFATAL  
0 NONE

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the erratic passing maneuver by the driver of the van when fog-limited visibility did not assure a clear distance ahead to complete the maneuver.

Contributing to this accident was an imbalanced brake condition in the van.

000074

## INVESTIGATION

### The Accident

On January 14, 1980, at about 8:00 a.m., a 1977 Ford van was traveling north on U.S. Highway 167 near Junction City, Arkansas, following a tractor-cargo-tank-semitrailer. Approaching a bridge over Little Corney Creek, the van pulled into the adjacent southbound lane to pass the truck and struck a southbound combination 1977 Mack truck tractor-1976 Fruehauf dump body semitrailer loaded with gravel. Just before impact, the van turned broadside. After impact, the gravel truck veered left across the roadway and overturned to the right, spilling its load. The van also overturned. (See figure 1.)

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>		<u>Passengers</u>	
	Van	Gravel Truck	Van	Gravel Truck
Fatal	0	1	4	0
Nonfatal	1	1	1	0
None	0	0	0	0

### Vehicle Information

The 1977 Ford Econoline van was owned by the Union County Center for the Handicapped in El Dorado, Arkansas. It was equipped with vacuum-assisted hydraulic disc brakes at the front and drum brakes at the rear, automatic transmission and an 8-cylinder engine. It also was equipped with lap belts at all positions and shoulder restraints at the driver and right-front-passenger positions. The van was painted chrome yellow with glossy black lettering on the sides and the rear. The words "School Bus" appeared on its rear. The odometer recorded 58,260 miles.

Damage to the van was extensive. The left rear corner was crushed at nearly a right angle to its longitudinal axis. This primary contact area ranged 80 inches forward from the rear of the vehicle. Secondary impact damage was at the left front corner, involving the bumper, wheel and headlight area. All but three windows in the van broke.

The left rear tire and wheel rim were broken from the vehicle during the collision. This tire exhibited a moderate flat spot and skid burn. Dents and gouges were present on the rim, both inside and outside, and the tire wall was badly torn near a dent and tear in the rim metal.

000075

The rear drum brakes showed uneven wear. The left rear lining was 1/32 inch above the rivets for the primary shoe; there was no lining above the rivets on the secondary shoe. In comparison, the linings for the rightside shoes were both 3/32 inch above the rivets. The left and right drum each had rivet grooves 1/64-inch-deep.

Tires were satisfactory, with adequate tread depth. The front tires were matched brands and had nearly equal wear. The rear tires were unmatched brands, although carcass type and number of plies were the same. Tread wear was unequal on the rear tires, but it was unknown how long the tires had been in their respective positions.

Examination of the rear lamps indicated that marker and brake lights were on at the time of the accident.

The company had no formal maintenance policy for the vehicle. It was largely the responsibility of the regular driver to request necessary repairs as they came to her attention.

The 1977 Mack tractor with a 1976 Fruehauf dump-body semitrailer was owned by Century Ready-Mix of Monroe, Louisiana. The tractor was equipped with a 6-cylinder diesel engine and manual transmission. A lap belt was available for the driver but was not in use at the time of the accident. The tractor had power steering, air-powered drum brakes, a heater and a CB radio.

The vehicle sustained general frontal damage. The one-piece hood-and-fenders unit was broken from its latches and hinges and pushed rearward into the windshield and door pillars. The lower edge of the windshield was shattered.

Mechanical inspection revealed fully functioning brakes, with lining thickness on all shoes greater than 19/32 inch on the tractor and 15/32 inch on the semitrailer.

The tractor-cargo-tank-semitrailer was not involved in the accident. The driver said he was traveling at about 40-45 mph when the van began to pass. He braked his vehicle and steered as far to the right as possible.

It was foggy at the time of the accident. Police responding to the scene stated that 35-40 mph was the maximum safe speed for the weather conditions.

#### Driver Information

The 24-year-old driver of the van held a valid Louisiana driver license with no restrictions. She drove the route along which the accident occurred as a part of her work duties. She had received no special training to drive the van. On the morning of the accident, the driver picked up the other five occupants in and near Junction City, Arkansas. The accident occurred at about the van's normal arrival time in El Dorado, but the accident site was approximately 18 miles south. The driver of the van recalled no details of the accident.

000076

One occupant, reportedly sitting behind the driver, had her lap restraint fastened, as was her normal practice. She died in the crash. No other van occupants used available restraints.

The 48-year-old gravel-truck driver held a valid Louisiana driver's license with no restrictions. He had driven a gravel truck for his present employer for one year. He reported that it was foggy on the morning of the accident and that he could see about 200 feet. As he approached the bridge and the oncoming tank-truck at about 50 mph, he suddenly saw the van pull out to pass the tank-truck. He recognized that it was a school bus and that they might hit, so he braked hard and steered as far right as he thought he safely could. He did not drive off the road for fear of overturning on a steep side slope. He thought that the van had passed the tank-truck and that there was room for it to pass to his left, when the van suddenly turned broadside to its right and crashed into the front of his vehicle.

#### Highway Information

U.S. Highway 167 is a two-lane asphalt arterial roadway. At the accident site the roadway is level and tangent as it crosses a creek via a concrete bridge. The traveled portion of the road is 23 feet 6 inches wide with 10-foot-wide asphalt shoulders. On the bridge, the road width is unchanged, but the edge-line-to-curb distance is 2 feet. As traffic approaches the bridge from the north, the guardrail extends 50 feet from the bridge on the right side of the roadway and 40 feet from the bridge on the left side. The roadway is painted with 4-inch-wide white edge lines and a 4-inch-wide broken yellow centerline.

There was evidence of precrash skidding from both vehicles. The van left one mark that was over 185 feet long on the west shoulder of the road.

#### ANALYSIS

The skidmarks indicate that the driver of the van may have tried to go off the road to the west of the gravel truck, but that vehicle steered to the west also, thus preempting the van's escape route. This left only a right steering maneuver for the van to pass to the east of the gravel truck. After the van already had moved left, to the west, the maneuver to the east was beyond its capabilities, given its locked left rear wheel. The van rotated clockwise out of control when the right turning performance was called for by the driver. The road surface was damp at the time of the accident. Traction was probably not degraded to the point where it contributed to this accident.

The mechanical inspection of the van indicated a long-existing brake imbalance problem. The left rear brake was doing more work than the right rear shoe, and the right rear brake shoes, at the least, had been replaced. The replacement of the brake shoes is inconsistent with the vehicle's recorded mileage. Thus it is likely that some braking problems existed for a period of time.

000077

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the erratic passing maneuver by the driver of the van when fog-limited visibility did not assure a clear distance ahead to complete the maneuver.

Contributing to this accident was an imbalanced brake condition in the van.

000078

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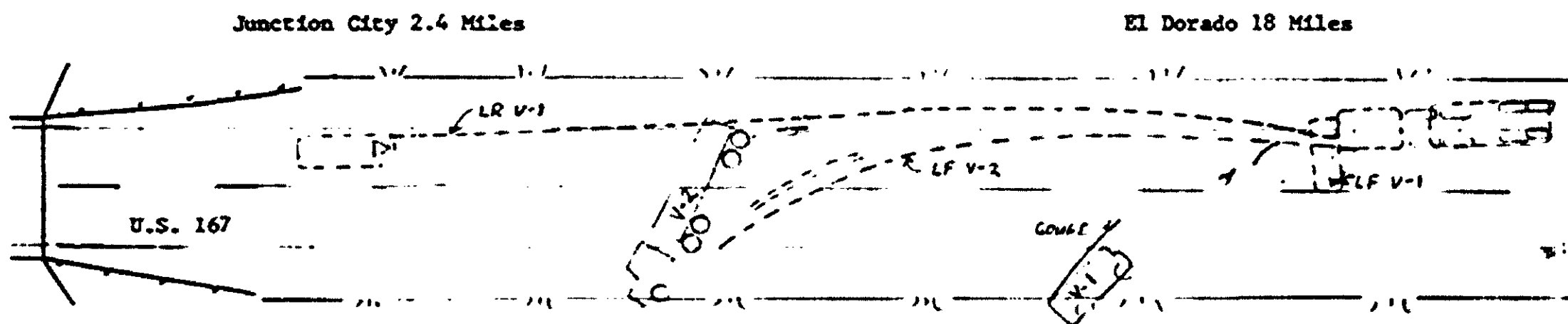


Figure 1

000079

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. ATL-80-F-H007

DOCKET NO. HY-236-80

LOCATION: U.S. Route 70N near State Route 56  
Baxter, Tennessee

FACILITY/VEHICLE:

1. 1973 Ford Torino  
Operator: Samuel D. Williams  
Baxter, Tennessee
2. 1966 Ford Mustang  
Operator: Kenneth W. Brown  
Baxter, Tennessee

TIME: 2230

DATE: 02/14/80

PROPERTY DAMAGE: \$3,000 (estimated)

INJURIES: 5 FATAL  
1 NONFATAL  
0 NONE

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the Torino driver, whose judgment and driving ability were impaired by alcohol, to maintain directional control of his vehicle while attempting to negotiate a right curve. Contributing to the cause and severity of the accident was the excessive speed of the Torino.

000080



## INVESTIGATION

### The Accident

At about 10:30 p.m., February 14, 1980, a 1973 Ford Torino was eastbound on U.S. Route 70N near Baxter, Tennessee, at a high rate of speed. As the vehicle entered a right-hand curve, the driver understeered, and the Torino crossed the centerline. Meanwhile, a 1966 Ford Mustang entered the same curve from the east. Apparently seeing the Torino, the Mustang driver steered left to avoid a collision. However, he was unable to evade the Torino, and the two vehicles collided, right-front-to-right-front, in the westbound traffic lane.

Impact forces drove the Mustang rearward and sideways across the centerline. It came to rest facing west, partially in the eastbound lane. The Torino continued moving forward, rotating clockwise. It came to rest facing west in the westbound lane. (See figure 1.)

Three of the four Mustang occupants, all high school boys en route home from a basketball game, were killed. The survivor was critically injured. Both the Torino driver and his wife, the only passenger, also died at the accident site. None of the six was using available seat restraints.

Neither vehicle left preimpact skid marks on the roadway, but a gouge mark in the westbound lane identified the approximate point of impact. Other gouge and scratch marks east of the point of impact in both lanes plotted both vehicles' postimpact paths.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>		<u>Passengers</u>	
	Torino	Mustang	Torino	Mustang
Fatal	1	1	1	2
Nonfatal	0	0	0	1
None	0	0	0	0

### Vehicle Information

The blue, two-door 1973 Ford Torino was owned by the driver's wife, an occupant in the car. It was in poor mechanical condition and had been inadequately maintained. Equipped with an hydraulic brake system, the Torino had front disc and rear drum brakes. Right rear wheel brake shoes were void of brake lining; only slight traces were evident on the left rear wheel brake shoe. The brake drums were worn and badly scored. The front wheel disc brakes contained worn brake pads and grooved braking discs. Tire pressure averaged 28 psi, and tire tread was less than the 2/32-inch minimal safe tread depth. The floor of the driver's compartment was littered with beer bottle caps and broken glass beer bottles.

000081

In contrast, the green-brown, 1966 two-door Ford Mustang, owned by the mother of the driver, was in good condition for a 14-year-old car. Its brake lining was intact, and the tires exhibited legal tread depth and air pressure.

#### Driver Information

The 34-year-old Torino driver arrived home shortly before the accident and then departed with his wife, who was clad only in her nightclothes. Investigation revealed no record of a valid Tennessee driver's license for the driver. The State of Tennessee had records neither of any motor vehicle infractions nor of any license application. However, the driver had been charged several times for public drunkenness. Postmortem blood alcohol analysis revealed a Blood Alcohol Level (BAL) concentration of 0.30 percent.

Both the Mustang driver and the front seat passenger were 16 years old; the two rear seat passengers were 14. Minutes before the collision, the four young men dropped another friend at his home after attending a local high school basketball game that ended shortly after 10:00 p.m. From the home of the fifth young man, the Mustang traveled about 2.2 miles westward on U.S. Route 70N to the accident location. According to the fifth young man, the driver, who held a valid Tennessee driver's license, was an extremely careful driver, never exceeding the speed limit for fear of damaging his mother's car in an accident. Postmortem blood analysis revealed a blood alcohol concentration of 0.0 percent.

#### Highway Information

U.S. Route 70N near Baxter, Tennessee, where the accident occurred, consisted of two east-west asphalt traffic lanes. The curve in which the accident occurred was reconstructed in 1925 to reduce its curvature from 10 degrees to its current curvature of 5 degrees and to improve its grade, which is relatively flat. Both of the 12-foot-wide traffic lanes were in good condition and were bordered by a solid white painted edge line. The two lanes were separated by a double yellow centerline, with adjacent reflectorized delineators installed at intervals of about 35 feet. The shoulders were improved with grayish compacted aggregate 6-to-8-feet wide. There was no pavement-to-shoulder drop-off. The posted speed limit for automobiles was 55 m.p.h.; there were no curve advisory speed signs or reflectorized delineators for the curve area.

#### ANALYSIS

Whether the Torino driver applied his brakes preparatory to evasive action just before the accident could not be determined. Absence of preimpact skid marks on the roadway does not preclude braking because the poor condition of the Torino brakes probably would have provided no effective braking action.

000082

Absence of skid marks did, however, preclude computation of preimpact vehicle speeds. However, based on the severity of vehicle damage and witness statements, it is reasonable to conclude the Torino was being driven in excess of the posted speed limit and the Mustang at or below 55 m.p.h.

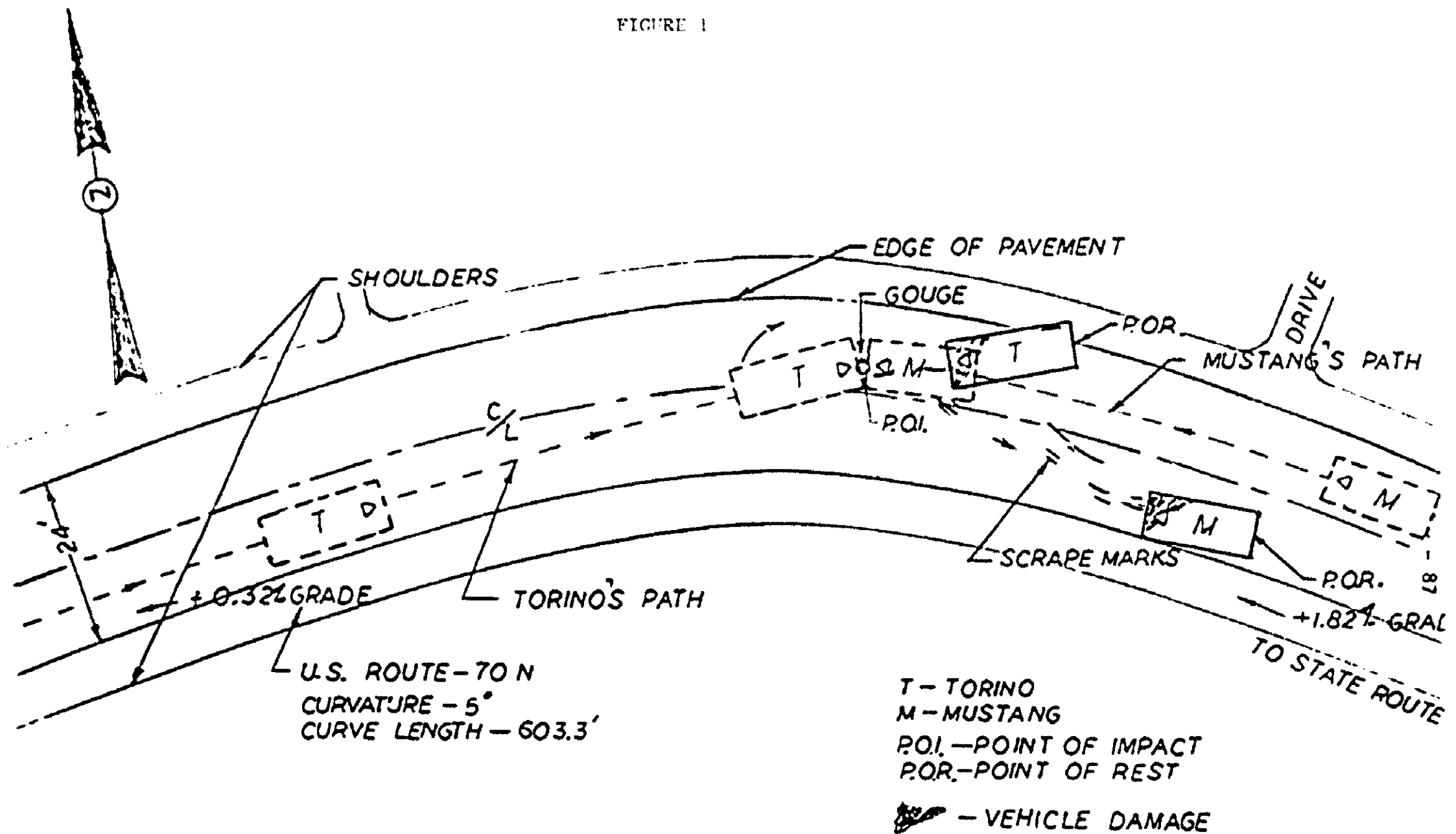
Physical evidence that the point of impact was in the westbound lane indicated that the Torino driver crossed the centerline and encroached upon the right-of-way of the oncoming Mustang. The driver of the Mustang apparently realized the sudden danger and steered left. Resultantly, the right fronts of both vehicles collided in such a manner that crash forces simultaneously raised the Torino's rear wheels from the roadway and gyrated the vehicle clockwise as it slid to final point of rest. As this occurred, the Torino's gyral forces redirected the Mustang's rearward movement from the westbound traffic lane to the eastbound lane.

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the Torino driver, whose judgment and driving ability were impaired by alcohol, to maintain directional control of his vehicle while attempting to negotiate a right curve. Contributing to the cause and severity of the accident was the excessive speed of the Torino.

000083

FIGURE 1



NOT DRAWN TO SCALE

000084

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. MKC-80-F-H013

DOCKET NO. HY-237-80

LOCATION: Farm-to-Market Road 2004  
near Angleton, Texas

FACILITY/VEHICLE:

1. 1974 Toyota Celica  
Operator: John Russell Barger  
Hitchcock, Texas
2. 1977 Chevrolet Corvette  
Operator: Warren Joe Colbert  
Dickinson, Texas
3. 1978 International Transtar II tractor  
Operator: Petro-Chemical Transport, Inc.  
Houston, Texas

TIME: 0548

DATE: 02/15/80

PROPERTY DAMAGE: \$30,000 (estimated)

INJURIES:     5     FATAL  
               1     NONFATAL  
               0     NONE

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of the accident was the erratic passing maneuver by the Toyota driver when fog-limited visibility did not assure a clear distance ahead to complete the maneuver.

000085

## INVESTIGATION

### The Accident

While passing a westbound 1977 Chevrolet Corvette, on February 15, 1980, at about 5:48 a.m., a 1974 Toyota Celica struck an eastbound 1978 International tractor-cargo-tank-semitrailer headon. The accident occurred in a fog where visibility was estimated to be about 200 feet. All three vehicles slid off the road, and the tank truck overturned. The vehicles did not catch fire.

The accident occurred on Texas Farm-to-Market (FM) Road 2004 near Angleton, Texas. The driver of the truck stated that he first noticed 2 pairs of headlights approaching in heavy fog. He estimated his speed at 40 to 45 mph. He estimated about 200 feet separated the vehicles at this point. He lightly applied his brakes, expecting the vehicle in his lane to move back into its proper lane. The encroaching vehicle did not move out of his path and he applied full braking power, initiating a jackknife. However, the Toyota struck the front of the tractor before a full jackknife occurred.

The occupants of the Toyota and Chevrolet were trapped in their respective vehicles; it took 3 hours to extricate all victims. The driver of the Chevrolet died en route to the hospital. All four Toyota occupants died. The truckdriver suffered minor injuries.

Police officers responding to the accident reportedly traveled only 40-45 mph because of limited visibility due to the heavy fog.

### Injuries to Persons

<u>Injuries</u>	<u>Driver</u>			<u>Passengers</u>		
	Toyota	Chevrolet	Truck	Toyota	Chevrolet	Truck
Fatal	1	1	0	3	0	0
Nonfatal	0	0	1	0	0	0
None	0	0	0	0	0	0

### Vehicle Information

The 1974 Toyota Celica 2-door sedan was owned by the driver. It was equipped with a 4-cylinder engine, manual transmission, manual steering and manual brakes. Damage was extensive, primarily consisting of frontal crush. Mechanical inspection revealed no brake or steering system discrepancy. Tire tread depth was adequate on all tires.

The 1977 Chevrolet Corvette was owned by the driver. It was equipped with an 8-cylinder engine, automatic transmission, power steering and power disc brakes. Damage was primarily to the front and left front of the vehicle. Mechanical inspection revealed no discrepancies in steering or brakes, and tire tread depth was adequate.

000086

The 1978 International Transtar II conventional tandem axle truck tractor was towing a Butler butane tank semitrailer. The combination was owned by Petro-Chemical Transport, Inc. of Houston, Texas. The tractor was equipped with a turbocharged 6-cylinder diesel engine, manual transmission, power steering and air-mechanical drum brakes. The tractor was totally disintegrated, although the trailer was not significantly damaged. All tires had adequate tread.

#### Driver Information

The Toyota driver was a 35-year-old male with 19 years of driving experience. He held a valid Texas operator's license restricted to corrective lenses. His Texas driving record showed one speeding violation, two years prior to the accident. He was on his way to work with three passengers at the time of the accident. He had been driving the accident route to and from work for six weeks. The group of men apparently was on schedule to reach work without hurrying.

The driver of the Chevrolet was a 45-year-old male with 29 years of driving experience. He held a valid chauffeur's license for transporting no more than 12 passengers, with no restrictions. His Texas driving record for the past 5 years showed: one speeding violation; one failure to drive in a single lane violation; one following too closely violation resulting in an accident. This driver was reputed to be a fast driver, and one witness volunteered that the Chevrolet passed him a few minutes before the accident, traveling very fast.

The driver of the tank truck was a 44-year-old male with 20 years of driving experience. He held a valid Texas commercial driver's license with no restrictions, and his Texas driving record showed five speeding violations and one previous accident in the past five years. This driver reported that he had just departed a refinery and had his headlamps and marker lamps on. He was certain they all were working because he cleaned them during offloading at the refinery.

#### Highway Information

Texas FM 2004 is a two-lane, asphalt roadway. The road has occasional hills and curves. At the accident site, the roadway is tangent, level and at-grade. It is marked with white edge lines, a broken yellow centerline and raised yellow reflectors along the centerline. The roadway is 24 feet wide with 2-foot-wide asphalt shoulders.

The pavement was worn and rutted. The driver of the tank truck reported that the road was wet and that there were puddles in the low spots of the wheel tracks. There were no precrash skid marks from any of the vehicles.

000087

### ANALYSIS

All drivers were familiar with the route, and none had an exceptional driving record. The driver of the Chevrolet apparently was known for his fast driving, but in this case he was being passed by the Toyota. The driver of the Toyota probably chose to pass the Chevrolet. With 200 feet of visibility, it is unlikely that the Toyota was surprised by a slower-moving Chevrolet and thus forced to pass to avoid hitting it. From the damage, vehicle dynamics and the statements of the tank truck driver, the two passenger cars were traveling nearly the same speed.

Heavy fog probably reduced visibility to less than the necessary clear distance for passing. The driver of the Toyota may have checked for oncoming traffic and, seeing nothing, assumed there was sufficient clear distance for a passing maneuver.

Wet pavement probably reduced traction to the extent that evasive braking and steering were ineffective.

### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the erratic passing maneuver by the Toyota driver when fog-limited visibility did not assure a clear distance ahead to complete the maneuver.

000088



NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. NYC-80-F-H005  
DOCKET NO. HY-240-80

LOCATION: Ohio State Route 73  
near Wilmington, Ohio

FACILITY/VEHICLE:

1. 1969 Chevrolet Impala  
Operator: John Bartram  
Wilmington, Ohio
2. 1973 Ford Pinto stationwagon  
Operator: Jerry Griffith  
New Vienna, Ohio

TIME: 1445

DATE: 03/01/80

PROPERTY DAMAGE: \$800 (estimated)

INJURIES: 5 FATAL

2 NONFATAL

0 NONE

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the Chevrolet driver's loss of directional control due to excessive speed, combined with an incompatible steering maneuver that resulted in the vehicle's encroaching on the opposing lane of traffic.

Contributing to the cause were the driver's alcohol impairment of judgment and driving ability and the scattered patches of snow on the road surface.

000089

## INVESTIGATION

### The Accident

About 2:45 p.m. on March 1, 1980, a 1969 Chevrolet Impala and a 1973 Ford Pinto stationwagon were approaching each other from the south and north, respectively, on State Route 73 between Wilmington, and New Vienna, Ohio.

Wind was blowing snow from adjacent snow covered fields across the road. Although the road surface was relatively clear, occasional patches of snow had formed.

As the two vehicles converged, the Chevrolet veered left across the yellow centerline into the southbound lane and collided with the southbound Ford. Both vehicles spun and were propelled off the west side of the highway. They came to rest at the bottom of a shallow shoulder-embankment.

None of the Ford occupants was ejected. The driver and two passengers were fatally injured. One passenger survived. All three Chevrolet occupants were ejected when the right side door sprung open during the collision. The driver and one passenger were killed. The other passenger was severely injured.

A northbound motorist who had been following the Chevrolet at an estimated 40 m.p.h. stated that the Chevrolet suddenly began to "speed up," and he lost sight of it. He said he saw it again when he came upon the accident site. The surviving Chevrolet passenger stated that the car began to slide, and he warned the driver to slow down.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>		<u>Passengers</u>	
	Chevrolet	Ford	Chevrolet	Ford
Fatal	1	1	1	2
Nonfatal	0	0	1	1
None	0	0	0	0

### Vehicle Information

The 1969 Chevrolet Impala 2-door sedan was owned by the driver. It was powered by an 8-cylinder engine and was equipped with power steering, power brakes and an automatic transmission. All tires had sufficient tread depth. Front and rear seats were equipped with occupant restraints.

Contact damage to the Chevrolet was limited to the right side and right front of the vehicle. The most serious damage was to the right front corner; this was torn, crushed and twisted. Other than relatively minor buckling of the left front fender, there was no collision damage to the left side of the car.

000090

The 1973 Ford Pinto 2-door stationwagon was owned by the driver. It was powered by a 4-cylinder engine and was equipped with automatic transmission, power brakes and power steering. The front seat occupant restraints consisted of lap belts and shoulder harnesses; the rear seats had lap belts.

Postcrash inspection of the Ford revealed that the most significant damage was to the left front. All vehicle components at the left front were deformed rearward, causing the right front to be pulled 20 inches to the left.

Interior damage was equally severe. The steering wheel and column were deformed. The dashboard was twisted and dented. The floor pan was deformed. The top of the rear seat back rest was displaced toward the front, and the front seats were tilted upward and forward from the rear.

#### Driver Information

Both the 25-year-old Chevrolet, and 35-year-old Ford drivers held valid Ohio State driver licenses with no restrictions. A check of their driving records revealed no previous accidents or violations.

A chemical analysis of the blood of both drivers revealed that the Ford driver's blood contained no drugs or alcohol. Although the Chevrolet driver's blood was free of drugs, it did contain .04 percent alcohol by weight. No autopsies were performed.

None of the 3 occupants in the northbound Chevrolet was using an occupant restraint. The four occupants of the southbound Ford were wearing available occupant restraints.

#### Highway Information

Ohio State Route 73 in the vicinity of the crash was a straight and level 2-lane north-south highway that connected Wilmington, and New Vienna, Ohio. The posted speed limit was 55 mph. The paved bituminous road surface was in good condition.

Opposing lanes were separated by a solid yellow and a broken yellow centerline, and the pavement edges were delineated by solid white edgelines. All lines were in good condition. The highway shoulders were a combination of a 2-foot paved shoulder strip and a 7-foot-wide grass-covered dirt section. Beyond the shoulders, the ground sloped downward about 3.5 feet to the level of the surrounding farm fields.

000091

Three preimpact tire marks made by the Chevrolet began in the northbound lane, proceeded diagonally across the yellow centerlines and ended in the southbound lane. The longest of these marks was 120 feet; it began on the paved shoulder strip of the northbound lane. The Ford left no visible tire marks. Gouges, scratches and an oil splatter stain were visible in the southbound lane.

#### Meteorological Information

Weather reports from Dayton and Cincinnati, both of which are 35 miles from the crash site, indicated that at the time of the crash, the temperature was 12 degrees F, the skies were overcast and winds were from the northeast at 15 to 20 knots. Surface visibility was between 1 1/2 and 5 miles, with obstructions in the form of blowing snow. Though it was not snowing at the time and place of the crash, it snowed the evening before.

#### ANALYSIS

Although there were no independent witnesses to the crash, sufficient evidence existed to determine the precrash direction of each vehicle and their dynamics during the crash sequence. Physical evidence indicated that the crash occurred in the southbound lane; that the northbound Chevrolet had crossed over the centerline into the southbound lane; and that the initial contact took place between the right front corner of the Chevrolet and the left front of the Ford.

It was estimated that the Chevrolet precrash speed at the start of the yaw was between 59 and 70 m.p.h.

The Chevrolet's excessive speed, scattered patches of snow on the road and reduced visibility, combined with the driver's .04 percent blood alcohol level (BAL), probably all contributed to a loss of vehicle control. The Chevrolet apparently drifted to the right edge of the road, and when the driver steered left, the turning radius was incompatible with the vehicle's speed and caused it to yaw. Directional control was completely lost, and the vehicle followed an uncontrolled path into the southbound lane. Since the Chevrolet's encroachment into the southbound lane began about 50 feet prior to the impact, the Ford driver had less than .5 second to perceive and react to the hazard. This indeed was insufficient time for perception of the hazard and evasive action.

Although there is a statutory presumption that a .04 percent BAL indicates that a driver is not under the influence of alcohol, a report on alcohol used in the text of Accident Research by Haddon, Suchman and Klein concluded that, "The role that alcohol plays in causing traffic accidents is probably greater than appears from official statistics and its action as a causative factor in traffic accidents begins at a lower alcohol value in the blood than has previously been considered.

000092

The threshold of impairment of driving ability in an expert driver accustomed to consuming moderate amounts of alcohol is an alcohol concentration of 0.035 to 0.04 percent in the blood. 1/

#### PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the Chevrolet driver's loss of directional control due to excessive speed, combined with an incompatible steering maneuver that resulted in the vehicle's encroaching on the opposing lane of traffic.

Contributing to the cause were the driver's alcohol impairment of judgment and driving ability and the scattered patches of snow on the road surface.

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1/ Kjell and Bjerver and Leonard Goldberg, "Effect of Alcohol Ingestion on Driving Ability." Quarterly Journal of Studies on Alcohol. No. 11 (1950) 1-30.

000093

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

SUMMARY REPORT

HIGHWAY

ACCIDENT NO. NYC-80-F-H002  
DOCKET NO. HY-241-80

LOCATION: Old Croton Dam Road and Aqueduct Street  
near Yorktown Heights, New York

FACILITY/VEHICLE:

1. 1970 Ford chassis/Superior Coach body schoolbus  
Operator: Vanguard Tours, Inc.  
Ossining, New York

TIME: 0753

DATE: 11/08/79

PROPERTY DAMAGE: \$3,000 (estimated)

INJURIES: 0 FATAL  
23 NONFATAL  
9 NONE

PROBABLE CAUSE:

The National Transportation Safety Board determines that the probable cause of this accident was the driver's loss of directional control of the schoolbus on a curve as a result of excessive speed.

000094

## INVESTIGATION

### The Accident

About 7:45 a.m. on November 8, 1979, a 1970 schoolbus occupied by a driver, mechanic/driver and 30, mostly male, high school students departed from Ossining High School in Ossining, New York, en route to a trade school located about 10 miles away in Yorktown Heights, New York.

Northbound on Aqueduct Street, the bus had completed about 6 miles of the route when it came to a curved "Y" intersection at Old Croton Dam Road. As the bus was negotiating the right curve onto Old Croton Dam Road, it yawed to the left, slid off the north edge of the road, overturned onto its left side and came to rest atop a guardrail with a tree embedded in the front section of the roof above the driver's seat.

Most of the students evacuated the bus through the rear emergency door; the driver and a few students exited through the windshield area. Twenty-two of the students were injured, only one seriously. Of the two adults aboard the bus, only the driver was injured.

### Injuries to Persons

<u>Injuries</u>	<u>Drivers</u>	<u>Passengers</u>
Fatal	0	0
Nonfatal	1	22
None	0	9

### Vehicle Information

The schoolbus was owned by Vanguard Tours, Inc., of Ossining, New York. It consisted of a Superior bus body mounted on a 1970 Ford 2-axle chassis with dual tires on each rear wheel. The estimated curb weight of the bus was 12,680 pounds; its estimated gross weight at the time of the crash was 17,245 pounds. The bus was powered by an 8-cylinder gasoline engine. It also was equipped with standard transmission, manual steering and vacuum booster hydraulic brakes.

Tire air pressures recorded by investigators were: left front, 50 psi; right front, 56 psi; left rear, 25 and 46 psi; and right rear, 46 and 50 psi. Based on the estimated gross vehicle weight, the outside left rear tire was severely underinflated; the inflation pressures in the other tires were minimally adequate.

Painted chrome yellow with black trim, the bus was equipped with 20 bench-type seats that provided seating for 60 children or 40 adults. There was one folding entrance/exit door at the right front of the bus, an emergency door at the rear and two emergency exit windows on each side of the bus.

000095

Postaccident inspection of the bus by the Yorktown Police Department and the New York State Department of Transportation indicated that the accelerator linkage, steering and brakes all were in adequate working condition, and all tires had sufficient tread depth. Maintenance records revealed that on November 6, 1979, two days before the accident, the bus was inspected and serviced, including among other things, an adjustment of the service brakes, repair of the emergency brake and a road test.

#### Driver Information

The 25-year-old bus driver was a resident of Ossining, New York and a former Ossining High School student who also had attended the trade school in Yorktown Heights. He held a valid New York State driver license with no restrictions. It authorized him to drive a schoolbus. He had no previous reported accidents but did have two traffic violation convictions, one for passing a signal light and other for improper passing. He was hired as a new schoolbus driver about 1 month before the accident occurred. Prior to this time, he was employed as a truckdriver. During the month of employment as a schoolbus driver, he received 8 hours of classroom instruction and 40 hours "behind the wheel" instruction in schoolbus driving.

The bus driver stated that he was driving 35 to 40 mph and that as he approached the curve, he shifted to a lower gear, but the bus did not slow. He then applied the brakes, but they did not work, so, he said, he tried to steer around the curve.

The driver stated that he inspected the bus before leaving the garage and found no mechanical deficiencies. The brakes, he said, worked properly up until the accident. The bus driver was familiar with the route he was driving.

#### Occupant Information

The mechanic/driver on board the bus told his safety supervisor that just before the crash he warned the driver about going too fast. He also said that he thought the kids, who had been taunting the driver, "got to him."

On November 2, 1979, on this route, this same group of students was responsible for an estimated \$900 worth of damage to the interior of the bus. They ripped open seat cushions and harassed the driver by throwing pieces of foam rubber at him while the bus was in motion. That bus driver refused to ever drive this group of students again.

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